JOSHUA TREE ESTATES
CEQA INTIAL STUDY

COMMUNITY OF JOSHUA TREE,
SAN BERNARDINO COUNTY, CALIFORNIA
APN 0605-051-01
TTM 20668

June 2026

Lead Agency:
County of San Bernardino
385 North Arrowhead Avenue, San Bernardino, California 92415

Project Proponent:
JT Santorini Villa LLC
1751 Colorado Boulevard #333, Los Angeles, California 90041
Kim@homeparadiserg.com | 626.673.2672

Prepared by
Lilburn Corporation
1905 Business Center Drive
tony@llilburncorp.com | 909-890-1818

SAN BERNARDINO COUNTY
INITIAL STUDY/MITIGATED NEGATIVE DECLARATION
ENVIRONMENTAL CHECKLIST FORM

This form and the descriptive information in the application package constitute the contents of Initial Study pursuant to County Guidelines under Ordinance 3040 and Section 15063 of the State CEQA Guidelines.

PROJECT LABEL

APNs:	0605-051-01	***USGS Quad:***	Joshua Tree North, California Topographic Quadrangle (7.5 minute)
Applicant:	JT Santorini Villa LLC 1751 Colorado Blvd #333 Los Angeles Ca 90041	***T, R, Section:***	Section 20, Township 1 North, Range 7 East, San Bernardino Meridian, County of San Bernardino, State of California
Location	Joshua Tree, East Desert Region, County of San Bernardino, State of California	***Thomas Bros:***	Page 4,889 R2 Column G
Project No:	PROJ-2023-00129	***Community Plan:***	Joshua Tree
Rep:	Kim Chen	***LUZD:***	Land Use: Rural Living (RL) 1 du/2.5 ac min Zoning District: Joshua Tree/ Rural Living (JT/RL)
Proposal:	Tentative Tract Map 20668 Joshua Tree Estates – Tentative Tract Map (TTM) 20668 to subdivide one (1) Parcel into thirty-two (32) Residential lots for thirty-two (32) single family homes ranging from 2 to 2.6 acres each., in the rural living (RL) Land Use category and The Joshua Tree/Rural Living (JT/RL) Zoning District; APN 0605-051-01; 3rd Supervisorial District.	***Overlays:***	United States Geological Survey (USGS) (7.5 minute) Joshua Tree North, California Topographic Quadrangle.

PROJECT CONTACT INFORMATION:

Lead agency: County of San Bernardino - Land Use Services
Department 385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

Contact person: Shannon Casey, Contract Planner III
Phone No: (909)387-8311
E-mail: Shannon.casey@lus.sbcounty.gov *Fax No:* (909) 387-3223

Project Sponsor: Kim Chen – JT Santorini Villa LLC
1751 Colorado Boulevard #33
Los Angeles, California 90041 (626) 673-2672

Environmental Consultant: Anthony DeLuca
Lilburn Corporation
1905 Business Center Drive
San Bernardino, CA 92408 (909) 890-1818

1.0 PROJECT DESCRIPTION

The purpose of this Initial Study/Mitigated Negative Declaration (IS/MND) is to evaluate the potential impacts resulting from the construction of the PROJ-2023-00129: Joshua Tree Estates Project (Project). Refer to *Tentative Tract No. 20668. Community of Joshua Tree. County of San Bernardino County. 07/19/2024. Prepared by: Adkan Engineers.* Richard Reeves P.E., P.L.S. (see Figure 1-1).

PROJECT SITE LOCATION

Located in the community of Joshua Tree, San Bernardino County, California, Assessor Parcel number (APN) 0605-051-01. The 80.2-acre Project site is bound by Broadway Street to the north, Sunever Road to the east, Sapphire Street to the south, and La Ferney Avenue to the west.

The Project is shown on the USGS Joshua Tree North, California Topographic Quadrangle. Situated within Section 20, Township 1 North, Range 7 East. Refer to *Figure 3-1 Joshua Tree Estates Vicinity Map and Figure 3-2 USGS Quadrangle Map.*

EXISTING SITE DESCRIPTION

The Project is located within the Mojave Desert geomorphic province of Southern California, characterized by isolated mountain ranges and desert plains. The Project is located within the Coyote Valley, bordered by the bunker mountains to the north, Bartlett Mountains to the West, Coyote Lake to the East, and Joshua Tree National Monument to the South. An ephemeral wash trends Northeast-to-Southwest across the property. Refer to *Figure 3-3 Joshua Tree Estates Regional Location Map.* The topography of the site is relatively flat, with surface runoff generally directed towards the northeast corner, where East Broadway intersects with Sunever Road. The elevation across the site varies by 70 feet. The property is sparsely vegetated, featuring a variety of shrubs and plants.

The site encompasses a total of 80.2 acres of undeveloped land. Of this, approximately 10.0 acres are designated for right-of-way dedication to accommodate both existing and proposed streets.

The topography of the site is relatively flat, with surface runoff generally directed towards the northeast corner, where East Broadway intersects with Sunever Road. The elevation across the site varies by 70 feet. The property is sparsely vegetated, featuring a variety of shrubs and plants. Refer to Pre-Development Rational Hydrology Map TTM 20668. County of San Bernardino. 2024/11. Prepared by: Adkan Engineers. Richard Reeves P.E., P.L.S.

The Project proposes to subdivide the property into 32 individual lots for the development of 32 single family residences. The lots would range in size from 2.0 to 2.6 acres in Rural Living (RL) Land Use category and the Joshua Tree/Rural Living (JT/RL) Zoning District, designated for the development of single-family residences. Each pad would have an approximate area of 10,000 square feet. The Project would be designed to ensure that the existing drainage courses running through the site remain unaltered, thereby preserving most of the natural desert landscape.

Construction activities of the subdivision, including grading, building, and street improvements, are planned to be executed in three distinct phases as described below.

- **Phase 1:** Lots 1-12, 12 Units, aiming to start summer 2026 and complete in the end of

2026 or early 2027

- **Phase 2:** Lots 16-20, 21-22, 10 Units, Jan 2027 to August 2027
- **Phase 3:** Lots 23-24, 25-32, 10 Units, Jun 2027 to Dec 2027 or Early 2028

The proposal aligns with the existing lot patterns, ensuring a seamless integration with the surrounding community.

Rough Grading is planned to cut raw earthwork of 13,077 C.Y. and fill 27,320 C.Y. with the net import of 14,243 C.Y. Impacts to air quality during the construction phase, where activities such as excavation and material transportation may generate dust are discussed in section 9.0 of this document. Additionally, there would be an increase in traffic during construction hours due to the movement of construction vehicles and equipment. This is a typical occurrence for any construction Project and would be managed to minimize disruption.

Estimated impact of the Project on the existing public circulation is expected to be minimal. The proposed development includes widening the current widths of East Broadway and Laferney Avenue, paving Sunever Road, and extending Sapphire Road. Internally, the development would introduce 64 additional vehicles, with each residence featuring a two-car garage. To accommodate the increased traffic load, three new 32-feet wide streets would be constructed.

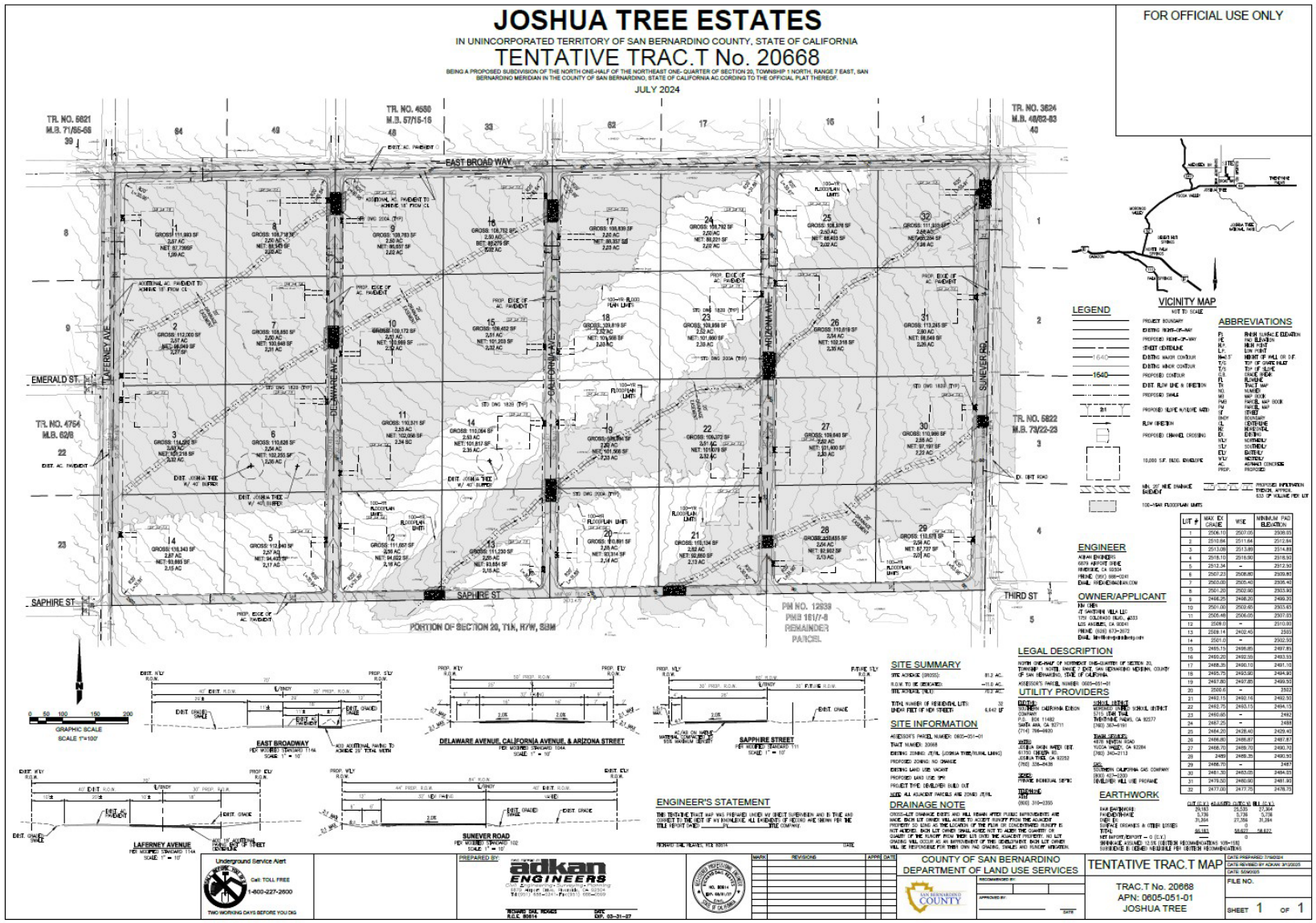
Public Services and Facilities Planned:

- Southern California Edison for electricity – Available onsite
- Frontier Communications for telephone and Internet – Available onsite
- Burrtec for trash services – Available onsite
- Southern California Gas Company for natural gas
- Developer would use Propane
- Joshua Basin Water District for Water
- Developer would construct Sewer
- Developer would use septic systems
- Morongo Unified School District for School System

DISCLAIMER

This document has been prepared pursuant to the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Sections 15000 et seq) and is consistent with the CEQA-Plus requirements of the State Water Resources Control Board (SWRCB) for Environmental Review and Federal Coordination. The County of San Bernardino would serve as the lead agency for CEQA purposes.[4]

Figure 1-1 Proposed Tentative Tract Map 20668



2.0 SURROUNDING LAND USES AND SETTING

The Project site is located in a sparsely developed area in the community Joshua Tree. The Project site and all parcels immediately surrounding the site have a Rural Living (RL) land use designation and a zoning of Joshua Tree/Rural Living (JT/RL) according to the Countywide Plan (CWP) Land Use Element Interactive Map.[1] To the west of the Project site there are existing single family residences Table 2.0-1 summarizes the existing land use and zoning of the Project site and surrounding parcels.

Table 2.0-1 Existing Land Use and Land Use Zoning Districts

Location	Existing Land Use	Land Use Category	Land Use Zoning District
Project Site	Vacant	Rural Living (RL)	Joshua Tree/Rural Living (JT/RL) 2.5 min lot size
North	Vacant	Rural Living (RL)	Joshua Tree/Rural Living (JT/RL) 2.5 min lot size
South	Vacant	Rural Living (RL)	Joshua Tree/Rural Living (JT/RL) 2.5 min lot size
East	Vacant	Rural Living (RL)	Joshua Tree/Rural Living (JT/RL) 2.5 min lot size
West	Single Residential	Rural Living (RL)	Joshua Tree/Rural Living (JT/RL) 2.5 min lot size

ADDITIONAL APPROVAL REQUIRED BY OTHER PUBLIC AGENCIES

Federal: None.

State of California: None.

County of San Bernardino: Land Use Services Department-Building and Safety, Public Health-Environmental Health Services, Special Districts, and Public Works.

Regional: Mojave Desert Air Quality Management District.

Local: None

[1] County of San Bernardino, Countywide Plan/Policy Plan 2020. *LU-1 Land Use Map*. Accessed April 2026 from https://www.arcgis.com/apps/webappviewer/index.html?id=f23f04b0f7ac42e987099444b2f46bc2.

3.0 PROJECT SITE PHOTOS AND FIGURES

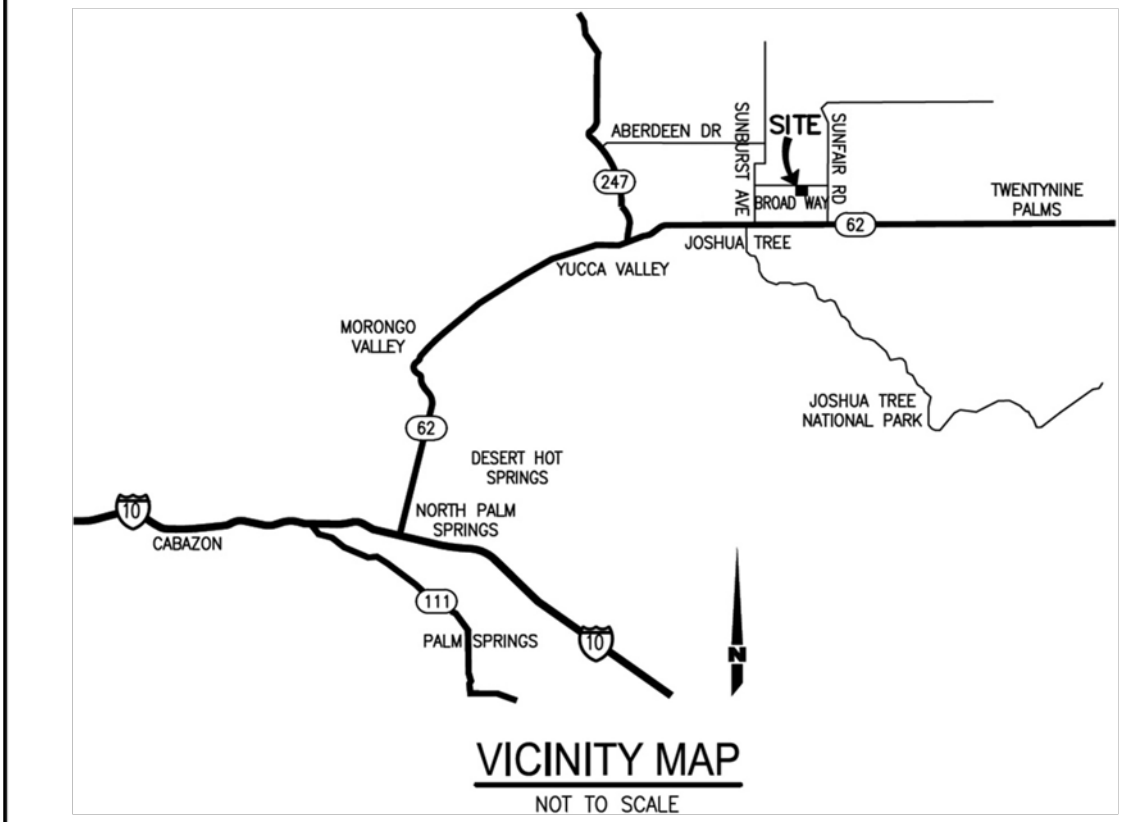
Photo-1: Broadway Street to the North (Looking in)

Photo-2: Broadway Street to the North (Looking out)

Photo-3: Sunever Road looking to the East (Looking in)

Photo-4: Sunever Road to the South (Looking out)

Figure 3-1 Joshua Tree Estates Vicinity Map



JOSHUA TREE ESTATES
TTM NO. 20668

Figure 3-2 USGS Quadrangle

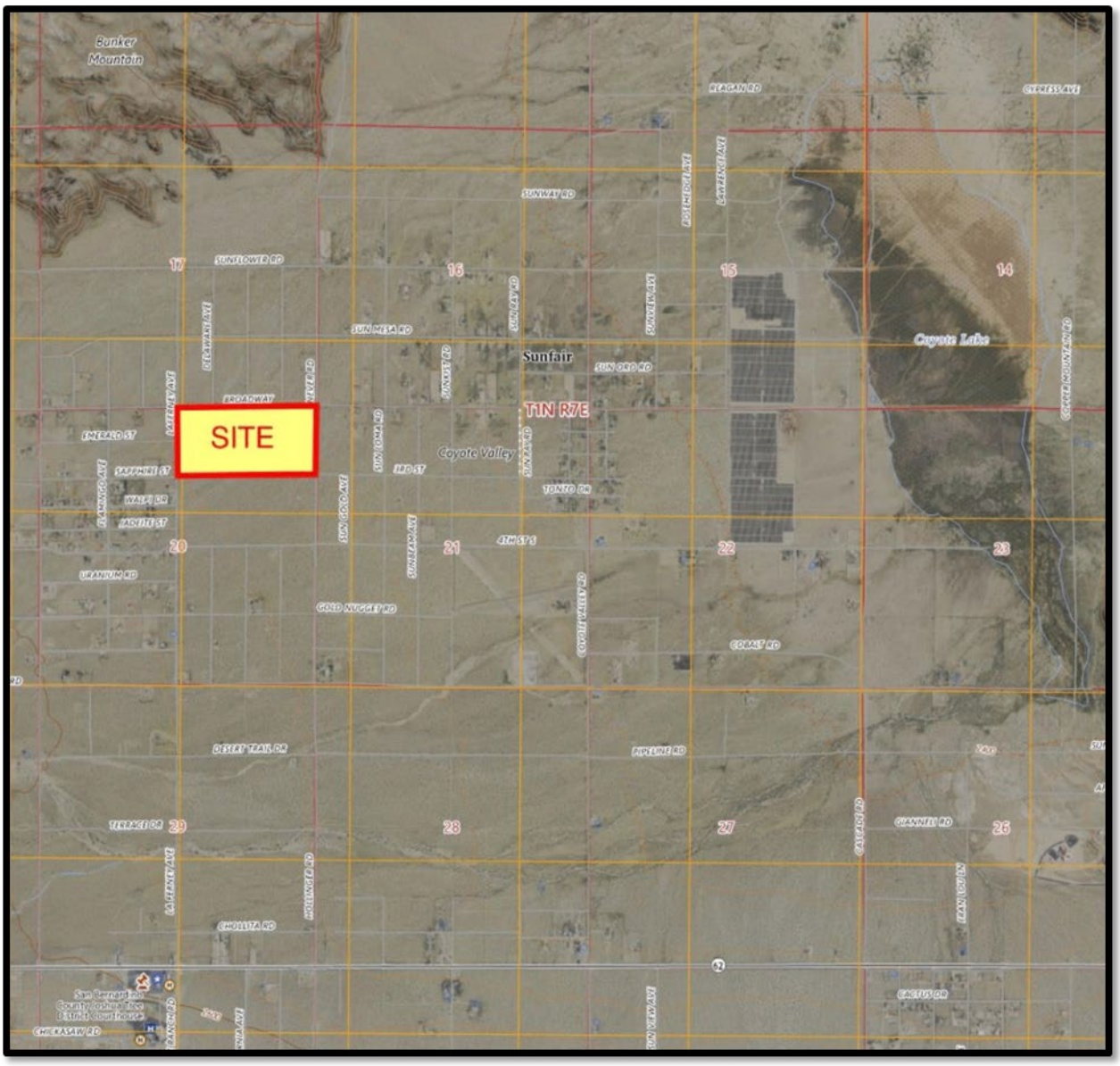


Figure 3-3 Joshua Tree Estates Regional Location

4.0 CONSULTATION WITH CALIFORNIA NATIVE AMERICAN TRIBES

Have California Native American tribes traditionally and culturally affiliated with the Project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentially, etc.?

On May 30, 2024 the County of San Bernardino mailed Project notification letters pursuant to AB52 to the following tribes: Twenty-Nine Palms Band of Mission Indians, Colorado River Indian Tribes, Fort Mohave Indian Tribe, Morongo Band of Mission Indians (MBMI), Yuhaaviatam of San Manuel Nation (YSMN), and Gabrieleño Band of Mission Indians-Kizh Nation. Table 4.0-1 below shows a summary of comments and responses (if received) and results of consultation if requested.

Table 4.0-1: AB-52 Consultation Summary

Tribe	Comment Letter Sent	Response Received	Summary of Response	Conclusion
Twenty-Nine Palms Band of Mission Indians	5/30/24	July 12, 2024	Project is outside of known Chemehuevi Traditional Use area	-
Colorado River Indian Tribes	5/30/24	None	-	-
Fort Mohave Indian Tribe	5/30/24	None	-	-
Morongo Band of Mission Indians	5/30/24	July 17, 2024 June 16, 2026	Request to initiate consultation. Request for more information (provided 12.30.24 and 8.8.25)	Standard Mitigation Measures provided
Yuhaaviatam of San Manuel Nation	5/30/24	July 26, 2024	No concerns with the Projects implementation	Standard Mitigation Measures provided
Gabrieleño Band of Mission Indians-Kizh Nation	5/30/24	None	-	-

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and Project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code

section 21083.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

5.0 EVALUATION FORMAT

This Initial Study is prepared in compliance with the California Environmental Quality Act (CEQA) pursuant to Public Resources Code Section 21000, et seq. and the State CEQA Guidelines (California Code of Regulations Section 15000, et seq.). Specifically, the preparation of an Initial Study is guided by Section 15063 of the State CEQA Guidelines. This format of the study is presented as follows. The Project is evaluated based on its effect on 20 major categories of environmental factors. Each factor is reviewed by responding to a series of questions regarding the impact of the Project on each element of the overall factor. The Initial Study checklist provides a formatted analysis that provides a determination of the effect of the Project on the factor and its elements. The effect of the Project is categorized into one of the following four categories of possible determinations:

Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less than Significant	No Impact

Substantiation is then provided to justify each determination. One of the four following conclusions is then provided as a summary of the analysis for each of the major environmental factors.

1. **No Impact**: No Impacts are identified or anticipated, and no mitigation measures are required.

2. **Less than Significant Impact**: No significant adverse impacts are identified or anticipated, and no mitigation measures are required.

3. **Less than Significant Impact with Mitigation Incorporated**: Possible significant adverse impacts have been identified or anticipated, and the following mitigation measures are required as a condition of Project approval to reduce these impacts to a level below significant. The required mitigation measures are: (List of mitigation measures)

4. **Potentially Significant Impact**: Significant adverse impacts have been identified or anticipated. An Environmental Impact Report (EIR) is required to evaluate these impacts, which are (List of the impacts requiring analysis within the EIR).

6.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture & Forestry Resources	☐	Air Quality
☒	Biological Resources	☒	Cultural Resources	☐	Energy
☐	Geology / Soils	☐	Greenhouse Gas Emissions	☐	Hazards & Hazardous Materials
☐	Hydrology / Water Quality	☐	Land Use / Planning	☐	Mineral Resources
☐	Noise	☐	Populations / Housing	☐	Public Services
☐	Recreation	☐	Transportation	☒	Tribal Cultural Resources
☐	Utilities / Service Systems	☐	Wildfire	☐	Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency) Based on this initial evaluation, the following finding is made:

On the basis of this Initial Study, the City of Rialto Environmental Review Committee finds:

☐ I find that the Proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the Proposed Project would have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the Proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the Proposed Project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the Proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Proposed Project, nothing further is required.

_____ _____
Signature: (Planner) Date

_____ _____
Signature: (Supervisor) Date

I. AESTHETICS

Except as provided in Public Resources Code Section 21099. Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Have a Substantial adverse effect on the Scenic Vista?	☐	☐	☒	☐
b) Substantial damage Scenic resources, included but not limited to trees, rock outcroppings, and historic buildings within a State Scenic Highway?	☐	☐	☐	☒
c) In Non-Urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public views are those that are experienced from a publicly accessible vantage point). If the Project is in an urbanized area, applicable Zoning and other regulations governing Scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

SUBSTANTIATION: *(Check ☐ if Project is Located within the view-shed of any Route listed in the General Plan):*

a) **Less than Significant** – The Project Site is located 2.0-miles North of the nearest State Scenic Highway, 29 Palms Highway (Highway 62) according to the Countywide Plan Natural Resources Element Map NR-3: *Scenic Routes & Highways*.[2] Mountainous Scenic Vistas are located roughly 1.0-mile North of the Project Site and distant views can be seen from Highway 62. However, these views are typical of all properties within the Mojave Desert. As a residential development, the Project activities would include temporary construction in compliance with County construction standards per the Building and Safety Division of San Bernardino County. Operation of the Project is that of typical residential use would be in compliance with all county Land development design standards for the existing zoning district. The Project would adhere to the applicable requirements of the County's Policy Plan to the desert area in which the site is located. The architectural elements of the proposed residences shall be of similar sizes and formation of the residences shall be similar to the existing surrounding residences. The Project Site is not anticipated to have a substantial adverse effect on scenic vista. Impact is expected to be less than significant.

b) **No Impact** – The Project site is approximately 2.0 miles north of the nearest scenic highway (Highway 62) according to the Natural Resources Element of the Countywide Plan. The Project location is not within the scenic highway and does not contain trees (Joshua trees

[2] San Bernardino Countywide Plan Natural Resources Element Map NR-3 Scenic Routes & Highways, accessed June 5, 2026 from, NR-3 Scenic Routes & Highways

are discussed in section 10 of this document), rock outcroppings or historic buildings according to Appendix C (Cultural Resources Assessment). No impact is expected.

c) **Less than Significant Impact** - The Project site is located in a non-urbanized area of the Community of Joshua Tree and is designated Rural Living (RL) Land Use category and the Joshua Tree/Rural Living (JT/RL) Zoning District for the development of single-family residences. Although the Project site's current condition is vacant, there would be no change in the zoning of the location and would not have substantial adverse effect on Scenic Vista as this residential development would be consistent with the character of nearby residential development in the RL zone. Neighboring residents would have a change in scenic character as Joshua trees would be removed, However, this would be a less than significant impact.

d) **Less than Significant Impact** - According to County of San Bernardino Countywide Plan the Community of Joshua Tree is regulated by Policy LU-4.7 Dark Skies, minimal light pollution and glare to preserve views of the night sky. Proposed lighting would be that of typical residential use and would be in compliance with the San Bernardino County Development Code Section 83.07.060 *Mountain and Desert Requirements.* A less than significant impact is expected.

Mitigation Measures: None required.

Monitoring: None required.

II. AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project, and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agriculture use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, Forest Land (as defined in Public Resources Code section 12220(g)), Timberland (as defined by Public Resources Code section 4526), or Timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of Forest Land or conversion of Forest Land to non-Forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion or Farmland, to Non-Agricultural use or conversion of Forest Land to Non-Forest use?	☐	☐	☐	☒

SUBSTANTIATION: *(Check ☐ if Project is in the Important Farmlands Overlay):*

a) **No Impact** - According to the California Department of Conservation, the Community of Joshua Tree North and its surrounding Communities are not mapped in the Farmland Mapping and Monitoring Program (FMMP). The Project is not proposed on lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, according to the California Department of Conservation, nor is it used for agricultural purposes. The proposed Project does not result in any changes to lands designated as Prime Farmland, Unique

Farmland, or Farmland of Statewide Importance by the California Dept. of Conservation, nor to lands used for agricultural purposes[3]. No Impact is anticipated.

b) **No Impact** - The Project is not proposed on lands under a current Williamson Act contract, under a Farmland Security Zone contract, or within an agricultural preserve[4]. Therefore, Project implementation does not result in conflicts with existing agricultural zoning. No Impact is anticipated.

c-d) **No Impact** – The Community of Joshua Tree and its surrounding desert areas fall under county jurisdiction as "Unincorporated Desert Region," no forestry or timber production exist in the general vicinity. No Impact is anticipated.

e) **No Impact** - According to the California Department of Conservation, the Community of Joshua Tree North and its surrounding Communities were not mapped in the Farmland Mapping and Monitoring Program (FMMP). The Project site does not have any agricultural or forest land, nor any land in active agricultural or timberland production uses and therefore, the Project would not convert farmland or forest land to non-agricultural and non-forestry uses, respectively. No Impact is anticipated

Mitigation Measures: None Required

Monitoring: None Required.

[3] California Department of Conservation Farmland Mapping and Monitoring Program accessed May 8, 2026 from Farmland Mapping & Monitoring Program

[4] California Williamson Act Enrollment Finder, Map Viewer, accessed May 8, 2026 from California Williamson Act Enrollment Finder

III. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district for air pollution control district might relied upon to make the following determinations. Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people)?	☐	☐	☒	☐

SUBSTANTIATION: *(Discuss conformity with the Mojave Desert Air Quality Management Plan, if applicable):*

a) **Less Than Significant Impact** - According to MDAQMD's 2020 CEQA and Federal Conformity Guidelines[5], a Project is considered non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A Project is conforming if it complies with all applicable District rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan).

Conformity with growth forecasts can be established by demonstrating that the Project is consistent with the land use plan that was used to generate the growth forecast. An example of a non-conforming Project would be one that increases the gross number of dwelling units, increases the number of trips, and/or increases the overall vehicle miles traveled in an affected area relative to the applicable land use plan. The Proposed Land Use Single-Family Residential is consistent with the Existing Land Use for the Project site Location and expected growth according to the County of San Bernardino General Plan. An Air Quality Assessment, included in the Joshua Tree Estates Project Tentative Tract Map TTM 20668 (Residential) *CalEEMod Runs*, March 11, 2026 has been prepared and included as Appendix A of this IS/MND.

The Project site is within the Mojave Desert Air Basin (MDAB) and under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The MDAB encompasses the desert portion of San Bernardino County. The MDAQMD has jurisdiction over air quality issues and regulations within the MDAB. To assist local agencies in determining if a project's emissions could pose a significant threat to air quality, the MDAQMD has adopted the

[5] Mojave Desert Air Quality District, CEQA and Federal Conformity Guidelines February 2020, accessed on May 8, 2026 from About Rule & Plan Development | Mojave Desert Air Quality Management District

California Environmental Quality Act (CEQA) and Federal Conformity Guideline (February 2020) which is a policy document intended to assist preparers of environmental analysis or review documents for projects within the jurisdiction of the MDAQMD by providing background information and guidance on the preferred analysis approach. The air and dust emissions from the construction and operational use of the Proposed Project were evaluated and compared to the MDAQMD air quality thresholds to determine significance.

Air emissions from the Proposed Project are subject to federal, State, and local rules and regulations implemented through provisions of the federal Clean Air Act, California Clean Air Act, and the rules and regulations of the California Air Resources Board (CARB) and MDAQMD. The federal Clean Air Act and California Clean Air Act were established in an effort to assure that acceptable levels of air quality are maintained. These levels are based upon health-related exposure limits and are referred to as National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). The ambient air quality standards establish maximum allowable concentrations of specific pollutants in the atmosphere and characterize the amount of exposure deemed safe for the public. Areas that meet the standards are designated attainment and if found to be in violation of primary standards are designated as nonattainment areas.

The Project site is currently zoned Rural Living (RL) within the Land Use Category of Rural Living (RL). The Project proposes to subdivide an 80-acre parcel into 32 single-family residential lots in order to construct 32 single family residences. No General Plan Amendment or Zone Change is required. As demonstrated below, the Proposed Project would not exceed MDAQMD thresholds. Therefore, less than significant impacts are identified or anticipated, and no mitigation measures are required.

b) **Less than Significant Impact** - Air quality emissions would occur within the Mojave Desert Air Quality Management District (MDAQMD). Emission evaluations follow CEQA Guidelines provided by MDAQMD for activities within its jurisdiction. Primary air emissions from the Project include temporary construction emissions (see Table III-2) associated with fugitive dust, heavy construction equipment, and construction workers commuting to and from the Project site as well as operational emissions (see Table III-3) once the residences are occupied. Air emissions evaluated include reactive organic gases (ROG), nitrogen oxides (NOX), inhalable and fine particulate matter (particulate matter with diameters 10 microns and smaller [PM10] and particulate matter with diameters 2.5 microns and smaller [PM2.5]), and diesel particulate matter. Emission calculations in this document were based on worst-case estimates of pollutant emissions to provide a conservative environmental analysis (See Appendix A for CalEEMod output data).

The MDAQMD and the Southern California Association of Governments (SCAG) are responsible for formulating and implementing the air quality attainment plan (AQAP) for the Basin. Regional AQAPs were adopted in 1991, 1994, and 1997. The following SIP and AQAP are the currently approved plans for the Basin region:

- 1997 SIP for Ozone (O_3), PM10, and Nitrogen Dioxide (NO_2)
- 1995 Mojave Desert Planning Area Federal PM10 Attainment Plan; no formal action by the U.S. Environmental Protection Agency (EPA)

The MDAQMD completed the MDAQMD 2004 Ozone Attainment Plan (State and federal) in April 2004, which has been approved by the EPA. The following includes, but is not limited to, the MDAQMD rules that are applicable to the Proposed Project:

Rule 201 (Permit to Construct) requires written authorization to build, erect, install, alter, or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants. With respect to the Proposed Project, this rule would apply to any stationary equipment that is not otherwise exempt from this rule as an insignificant source of air pollutants (see Rule 219).

Rule 203 (Permit to Operate) requires written authorization to operate any equipment, the use of which may cause the issuance of air pollutants, or the use of which may reduce or control the issuance of air contaminants. With respect to the Proposed Project, this rule would apply to any stationary equipment that is not otherwise exempt from this rule as an insignificant source of air pollutants (see Rule 219).

Rule 219 (Equipment Not Requiring A Written Permit Pursuant to Regulation II) specifies stationary sources that the MDAQMD considers to be insignificant sources of air pollutants that are exempt from **Rules 201 and 202.** With respect to the Proposed Project, the following sources would be exempt from permit requirements:

- Comfort air conditioning or ventilating systems which are not designed or used to remove air contaminants generated by, or released from, specific equipment units;
- Space heaters;
- Equipment used exclusively for steam cleaning;

Rule 402 (Nuisance). This rule specifies that a person may not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area). This rule requires owners or operators of a construction or demolition fugitive dust source to implement the fugitive dust control measures listed in Rule 403.2. These measures include periodic watering for short-term stabilization of disturbed surface area to minimize visible dust emissions, stabilization of graded surfaces if no development is planned within 30 days, reducing non-essential earth moving activity under high wind conditions, and more. In addition, for sites over 100 acres such as the Proposed Project, the control measures in Rule 403.2 must also be implemented. The additional control measures include preparing and submitting a dust control plan to the MDAQMD prior to commencing earth-moving activities. The dust control plan must describe all applicable dust control measures that would be implemented at the Project site. Other additional control measures to minimize visible fugitive dust for sites over 100 acres include stabilizing access routes, maintaining natural topography to the extent possible, and constructing paved roads and parking lots first where feasible.

Rule 1113 (Architectural Coatings). This rule requires manufacturers, distributors, and end-users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Rule 1160 (Internal Combustion Engines). This rule establishes limits for Volatile Organic Compounds (VOC), NOX, and carbon monoxide (CO) emissions associated with stationary internal combustion engines. However, the provisions of the rule do not apply to the following engines:

- All internal combustion engines rated at less than 500 brake horsepower.
- All internal combustion engines operated less than 100 hours within any continuous four consecutive calendar quarter period; and
- Emergency internal combustion engines.

Regulation XIII (New Source Review). For new and modified stationary sources subject to permitting requirements (see Rule 201), this series of rules prescribes the use of Best Available Control Technology and the provision of emission offsets (i.e., mitigation) for equipment whose emissions exceed specified thresholds. The applicability of these requirements would be determined upon submittal of an application for permit to construct under Rule 201.

The MDAQMD currently recommends that projects with construction-related and/or operational emissions that exceed any of the following emissions thresholds as shown in Table III-1 should be considered significant. The MDAQMD has identified thresholds of 100,000 tons per year or 548,000 pounds per day of CO_2e emissions for individual projects.

TABLE III-1: MDAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Annual Thresholds	Daily Thresholds
VOC	25	137
NOx	25	137
CO	100	548
SOx	25	137
PM10	15	82
PM2.5	15	82
Lead	0.6	3
Greenhouse Gases	100,000	548,000

Source: http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2910

CalEEMod calculates maximum daily emissions for summer and winter periods. The estimated maximum daily construction emissions with compliance with Rules 403.2 and 1113 are summarized in Table III-2 Detailed construction model outputs are presented in Appendix A.

Construction Emissions

The proposed 32 single-family residential units are anticipated to be constructed in three phases with 12 units including models in the first phase and 10 units in the second and third phase. The Project is anticipated to have an opening year of 2029. Construction activities associated with the Project would result in emissions of VOCs, NOX, SOX, CO, PM10, and PM2.5. Construction related emissions are expected from the following construction activities:

- Site Preparation
- Grading
- Building Construction
- Architectural Coating
- Paving

Dust is typically a major concern during grading and excavation activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). CalEEMod was utilized to calculate fugitive dust emissions resulting from this phase of activity. This analysis assumes that earthwork activities would result in a balanced earthwork condition with no export or import of soils.

Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information included in CalEEMod.

CalEEMod calculates maximum daily emissions for summer and winter periods. The estimated maximum daily construction emissions with compliance with Rules 403.2 and 1113 are summarized in Table III-2. Detailed construction model outputs are presented in Appendix A. The emissions estimated in Appendix A are utilized to include the emissions reductions from compliance with MDAQMD rules. With the inclusion of these measures regional emissions would be less-than-significant, as shown in Table III-2.

TABLE III-2: CONSTRUCTION EMISSIONS SUMMARY COMPARED AGAINST THRESHOLDS

Activity	Emissions (lbs/day)					
	VOC	NOX	CO	SOX	PM10	PM2.5
Maximum Daily Summer Emissions	17.6	36.1	39.6	0.08	8.2	4.2
Maximum Daily Winter Emissions	18.9	36.1	39.0	0.08	8.2	4.2
MDAQMD Regional Threshold	**137**	**137**	**548**	**137**	**82**	**82**
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**
Annual Maximum Emissions	0.33	2.34	2.68	0.005	0.39	0.21
MDAQMD Regional Threshold	**25**	**25**	**100**	**25**	**15**	**15**
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod, Appendix A.

Operational Emissions

Operational or long-term emissions occur over the life of the Project. Both mobile and area sources generate operational emissions. Area source emissions arise from consumer product usage, heaters that consume natural gas, gasoline-powered landscape equipment, and architectural coatings (painting). Mobile source emissions from motor vehicles are the largest single long-term source of air pollutants from the operation of the Project. Small amounts of emissions would also occur from area sources such as the consumption of propane for heating, from landscaping emissions, and consumer product usage. The operational emissions were estimated using the latest version of CalEEMod.

Mobile Sources

Mobile sources include emissions from the additional vehicle miles generated from the proposed Project. The Project would generate approximately 302 weekday trips per day. The program then applies the emission factors for each trip which is provided by the EMFAC2017 model to determine the vehicular traffic pollutant emissions. The CalEEMod default trip lengths were used in this analysis. Please see CalEEMod output comments sections in Appendix A for details.

Area Sources

Area sources include emissions from consumer products, landscape equipment and architectural coatings. Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. As specifics were not known about the landscaping equipment fleet, CalEEMod defaults were used to estimate emissions from landscaping equipment.

Per MDAQMD Rule 1113 as amended on April 23, 2012, the architectural coatings that would be applied after January 1, 2013 would be limited to an average of 150 grams per liter or less.

The operations-related criteria air quality impacts created by the Proposed Project have been analyzed through the use of CalEEMod model. The operating emissions were based on year 2025, which is a conservative estimate of the opening year for the Project. The summer and winter emissions created by the Proposed Project's long-term operations were calculated and the highest emissions from either summer or winter are summarized in Table III-3.

TABLE III-3: REGIONAL SIGNIFICANCE - OPERATIONAL EMISSIONS BY SECTOR (TONS/YEAR)

Activity	Pollutant Emissions (tons/year)[1]					
	VOC	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Area Sources[2]	0.29	0.002	0.16	0.00001	0.00008	0.00006
Energy Usage	0.005	0.05	0.02	0.0003	0.004	0.004
Mobile Sources[3]	0.24	0.29	2.11	0.006	0.61	0.16
Total Emissions	**0.53**	**0.34**	**2.29**	**0.006**	**0.61**	**0.16**
MDAQMD Annual Thresholds	**25**	**25**	**100**	**25**	**15**	**12**
Exceeds Threshold?	No	No	No	No	No	No

Notes:
1 Source: CalEEMod Version 2022.1.1.39
2 Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.
3 Mobile sources consist of emissions from vehicles and road dust.

Table III-3 provides the Project's unmitigated operational emissions. Table III-3 shows that the Project does not exceed the MDAQMD regional emissions thresholds. Therefore, operational emissions are considered to be less than significant.

The Project site is located within unincorporated San Bernardino County. As shown by the results of the air analysis, the Project's emissions do not exceed any MDAQMD thresholds during either short-term construction or long-term operation of the Project. Therefore, as the Project is a residential use, the proposed Project is not anticipated to exceed the Attainment Plan assumptions for the Project site. Based on the above, the proposed Project

would not conflict with the implementation of the MDAQMD Attainment Plans, impacts are considered to be less than significant.

Cumulative projects include local development as well as general growth within the Project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered, would cover an even larger area. Accordingly, the cumulative analysis for the Project's air quality must be generic by nature.

The Project area is out of attainment for both ozone and particulate matter. Construction and operation of cumulative projects would further degrade the air quality of the Mojave Desert Air Basin. The greatest cumulative impact on the quality of regional air cell would be the incremental addition of pollutants mainly from increased traffic from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously. However, in accordance with the MDAQMD methodology, projects that do not exceed the MDAQMD criteria or can be mitigated to less than criteria levels are not significant and do not add to the overall cumulative impact.

Project operations would generate emissions of NOx, ROG, CO, PM10, and PM2.5, which would not exceed the MDAQMD regional thresholds and would not be expected to result in ground level concentrations that exceed the National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS). Therefore, operation of the Project would not result in a cumulatively considerable net increase for non-attainment of criteria pollutants or ozone precursors. As a result, the Project would result in a less than significant cumulative impact for operational emissions.

c) **Less than Significant Impact** - Sensitive receptors are populations most vulnerable to air quality impacts, including children, the elderly, and individuals with pre-existing health conditions. Common examples include residences, schools, daycare facilities, hospitals, and senior living centers. A review of aerial imagery and land use data indicates that the nearest sensitive receptors to the Project site are 2.0 miles away. Project construction would result in temporary emissions from construction equipment, material handling, and vehicle trips. However, given the Project's limited scale, short construction duration, and compliance with applicable emissions control regulations (e.g., CARB off-road diesel engine standards, SCAQMD Rule 403 for dust control), pollutant concentrations at the nearest sensitive receptors would not exceed applicable thresholds. Project operations would not involve substantial stationary sources or high volumes of vehicle traffic and would therefore not result in long-term pollutant exposure to nearby sensitive receptors.

The Project would introduce new sensitive receptors (i.e. Residents) to this area. Considering that the location is Rural Vacant land there are few existing sensitive receptors by way of existing residents to the west of the Project site. These include one single family residence across the intersection of Laferney Avenue and E. Broadway at approximately 185 feet, and two single family residences near the southwest corner of the site on Laferney Road, one at approximately 400 feet and one approximately 320 feet from the Project site. A Project would have a significant impact on sensitive receptors if it exposed them to substantial pollutant concentrations that exceed applicable federal, state, or local air quality standards or thresholds of significance. As an additional residential development, this is not expected to occur.

Based on the scale of the Project, the temporary nature of construction emissions, adherence to regulatory requirements, and modeled pollutant concentrations remaining below applicable thresholds. Less than Significant impact is anticipated.

d) **Less than Significant Impact** - No other emissions leading to odors would be generated by this Project other than what would be typical of a low-density Residential Subdivision which do not typically emit offensive odors. Operational or long-term emissions occur over the life of the Project. Both mobile and area sources generate operational emissions. Area source emissions arise from consumer product usage, heaters that consume natural gas, gasoline-powered landscape equipment, and architectural coatings (painting). Mobile source emissions from motor vehicles are the largest single long-term source of air pollutants from the operation of the Project. Small amounts of emissions would also occur from area sources such as the consumption of propane for heating, from landscaping emissions, and consumer product usage other than solvents and cleaners typical of residential use.

Mobile sources include emissions from the additional vehicle miles generated from the proposed Project. The Project would generate approximately 302 weekday trips per day.

Area sources include emissions from consumer products, landscape equipment and architectural coatings. Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. As specifics were not known about the landscaping equipment fleet, CalEEMod (Appendix A) defaults were used to estimate emissions from landscaping equipment.

Construction of the proposed Project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project site. Temporary construction would not result in uncontrolled sources of odor during construction if application of Standard Odor Control Technology as described in the recommendations below is carefully implemented to reduce potential impacts associated with odor.

- Low-VOC Materials: Choosing paints, adhesives, and sealants labeled as low-VOC or zero-VOC can significantly reduce construction odors.
- Waste Management: Proper waste segregation and frequent removal from the site can prevent the buildup of odor-causing materials.
- Covering Materials: Covering stockpiles of materials like sand and gravel with tarps can prevent wind from dispersing dust and associated odors.
- Drying and Curing Times: Allowing sufficient drying and curing time for paints, adhesives, and concrete minimizes off-gassing and trapped moisture that can contribute to odors.
- Regular Cleaning: Maintaining cleanliness during construction, including dust control and proper disposal of odorous materials, reduces odor accumulation.

Less than Significant Impact is anticipated and no mitigation measures are required.

Mitigation Measures: None Required.

Monitoring: None Required.

IV. BIOLOGICAL RESOURCES

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Have Substantial adverse effects, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?	☐	☐	☐	☒

SUBSTANTIATION: *(Check if Project is located in the Biological Resources Overlay or contains habitat for any species listed in the California Natural Diversity Database)*: ☐

Hernandez Environmental Services (HES) was contracted by Brian F. Smith and Associates to prepare a General Biological Assessment (GBA) (Appendix B) for an approximately 81.2-acre Project site in the unincorporated community of Joshua Tree, San Bernardino County, California. HES conducted a literature review and reviewed aerial photographs and topographic maps of the Project site and surrounding areas. The Joshua Tree North and eight surrounding USGS 7.5'

topographic quadrangles were used to identify sensitive species with the California Natural Diversity Data Base (CNDDB), the U.S. Fish and Wildlife Service (USFWS) Endangered Species Lists, and the California Native Plant Society (CNPS) rare plant lists to obtain species information for the Project area. The CNDDB and USFWS critical habitat databases were utilized, together with Geographic Information System (GIS) software, to locate the previously recorded locations of sensitive plant and wildlife occurrences and designated critical habitat and determine the distance from the Project site.

On July 16, 2025, HES conducted a field survey of the Project site. The ambient temperature at 11:30 A.M. was 90-93 degrees Fahrenheit, sunny, with winds ranging from zero to eleven miles per hour from the northeast. The purpose of the field survey was to document the existing habitat conditions, obtain plant and animal species information, view the surrounding land uses, assess the potential for state and federal waters, assess the potential for wildlife movement corridors, and assess the presence of constituent elements for critical habitat, if present.

a) **Less than Significant Impact with Mitigation Incorporated** - The Proposed Project is expected to impact the entire 80.2-acre site. Implementation of the Proposed Project would impact approximately 79.91 acres of creosote bush scrub and 1.29 acres of disturbed habitat.

A full discussion of sensitive plant and animal species that were observed or have the potential to occur on site can be found in Appendix B *General Biological Assessment* prepared for the Project. Those that were observed and could potentially be impacted by implementation of the Project are briefly discussed below.

Sensitive Species

Western Joshua tree

The Western Joshua tree is a state listed Candidate Endangered species. This species is protected under the Western Joshua Tree Conservation Act and the California Endangered Species Act (CESA), which prohibits the take of any species of wildlife designated by the California Fish and Game Commission as endangered, threatened, or candidate species. Three individual Joshua trees were found during the general biological assessment. Implementation of the mitigation measures (MM BIO-5) outlined below would reduce impacts to less than significant.

Burrowing owl

Burrowing owl (*Athene cunicularia*) is a CDFW Species of Special Concern. This species is a subterranean nester, dependent upon burrowing mammals such as the California ground squirrel. It inhabits open, dry annual or perennial grasslands and scrublands characterized by low-growing vegetation. There are occurrences of this species recorded on CNDDB within 2 miles of the site. This species has the potential to be present.

Desert tortoise

Desert tortoise is a state and federally listed Threatened species. This species has potential to be found on the Project site. The desert tortoise requires friable soil for burrow and nest construction. It prefers creosote bush habitat with large annual wildflower blooms. Although, not observed during the Biological survey, suitable habitat occurs on site. Implementation of the mitigation measures outlined below would ensure impacts to this species are less than significant.

Bendire's Thrasher

Bendire's thrasher is a CDFW Species of Special Concern. This species is migratory local spring/summer resident in flat areas of desert succulent shrub/ Joshua tree habitats in Mojave Desert. Although, not observed during the Biological survey, suitable habitat occurs on site. Implementation of the mitigation measures outlined below would ensure impacts to this species are less than significant.

Le Conte's Thrasher

Le Conte's Thrasher is a CDFW Species of Special Concern. Suitable habitat for this species occurs on site. Implementation of the mitigation measures outlined for nesting birds below would ensure impacts to this species are less than significant.

Nesting Birds

Potential impacts to nesting birds may occur if ground disturbing activities or vegetation removal occur during the bird nesting season of February 1 through September 15. Implementation of the mitigation measure below would ensure that potential impacts to nesting birds are less than significant.

Mitigation Measures

BIO – 1: Desert Tortoise. Prior to the issuance of any ground disturbing permit on the Project site, pre-construction Focused Surveys consistent with the requirements of the USFWS 2019/ND, "Preparing For Any Action That May Occur Within the Range of the Mojave Desert Tortoise (*Gopherus agassizii*).", are required.

If a Desert Tortoise is found onsite during construction, all activities likely to affect that animal(s) must cease and the County, CDFW and USFWS must be contacted to determine appropriate steps. No take of the tortoise(s) may occur without prior authorization from the appropriate regulatory agencies, including CDFW and USFWS

BIO – 2: Burrowing Owl. Prior to initiation of ground disturbing activity on the Project site, two Pre-Construction Focused Burrowing Owl surveys following the guidelines in Appendix D of the 2012 Department of Fish and Game Staff Report on Burrowing Owl Mitigation, would be performed on site by a qualified biologist.

An initial avoidance survey shall be conducted no less than 14 days prior to commencing ground-disturbance activities and a final survey carried out within 24 hours prior to ground disturbance

Should the species be identified on the site, the qualified biologist shall consult with CDFW on the development and implementation of a comprehensive burrowing owl mitigation plan.

BIO – 3: Nesting Birds. If possible, the removal of vegetation preparatory to construction shall occur outside the nesting season (February 1 to August 31) for birds to avoid direct impact.

If vegetation removal occurs during the migratory bird nesting season (February 1 and September 15), pre-construction nesting bird surveys shall be performed by a qualified Biologist within three days prior to vegetation removal and construction activities. If no nests are found, construction may proceed.

If active nests are found, a buffer zone of 500 feet for raptor birds and/or 250 feet for other unlisted birds would be put in place around the nest until the young have fledged.

b) **Less than Significant Impact** - The Project site contains one braided ephemeral channel that crosses the site from the northeast to the southwest. The ephemeral braided channel that is potential CDFW and Regional Water Quality Control Board (RWQCB) jurisdictional waters. The onsite drainage leads to a dirt road and has no visible physical surface connection to any federal jurisdictional waters. No wetlands occur on site. Impacts are expected to be less than significant.

c) **Less than Significant Impact with Mitigation Incorporated** - The Proposed Project is expected to impact the entire site including the state jurisdictional drainage on site. A jurisdictional delineation would need to be performed to determine the extent of state waters on site. CDFW and RWQCB jurisdictional waters, are regulated by state, and local governments under a no-net-loss policy, and all impacts are considered significant and should be avoided to the greatest extent possible. **BIO-4** below would reduce impacts to jurisdictional waters to less than significant.

Mitigation Measure

BIO-4: Jurisdictional Delineation. A jurisdictional delineation would need to be performed to determine the extent of state waters on site. Impacts to jurisdictional waters require mitigation through habitat creation, restoration, or enhancement as determined by consultation with the regulatory agencies during the permitting process. Any impacts to CDFW jurisdiction would require a Section 1602 Streambed Alteration Agreement from CDFW. Any impacts to waters of the State would require a WDR under Porter-Cologne from the RWQCB. Mitigation for impacts to jurisdictional resources would be addressed in a mitigation plan to be submitted for approval with the permit application packages.

d) **No Impact** - Critical habitat is designated by USFWS for endangered and threatened species per the federal ESA (16 U.S.C. § 1533 (a)(3)), and to the extent prudent and determinable. Special management of critical habitat, including measures for water quality and quantity, host animals and plants, food availability, pollinators, sunlight, and specific soil types is required to ensure the long-term survival and recovery of the identified species. Critical habitat designation delineates all suitable habitat for the species. The Project site is not located within or adjacent to federally designated critical habitat for endangered species.

e) **Less than Significant Impact with Mitigation Incorporated -** The San Bernardino County Development Code Section 88.01.060 provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources. Per Section 88.01.060 of the San Bernardino County Development Code the listed desert native plants or any part of them, except the fruit shall not be removed except under a Tree or Plant Removal Permit.

Three Joshua trees are located on or adjacent to the Project site and would be mitigated with the implementation of Mitigation Measure BIO-5 below. No other desert native plants regulated under Section 88.01.060 of the San Bernardino Development Code are present on

the site. Section 88.01 requires the issuance of a county tree removal permit prior to the removal of regulated trees and plants, as well as approval from California Department of Fish and Wildlife (CDFW). Implementation of the mitigation measure outlined below would ensure that no conflicts with local policies or ordinances would occur and impacts would be reduced to less than significant.

Mitigation Measures

BIO-5: Joshua Trees. Any impacts to the Joshua tree would require compliance with the Western Joshua Tree Conservation Act (WJTCA) which was passed in July 2023 to conserve western Joshua tree and its habitat while supporting the state's renewable energy and housing priorities. The WJTCA authorizes CDFW to:

- Permit the trimming and removal of hazardous or dead western Joshua trees.

  Permit the incidental take of western Joshua trees under CESA provided the permittee meets certain conditions. Any impacts to the Joshua trees on site would require prior authorization from CDFW.

f) **No Impact -** According to the GBA prepared by Hernandez Environmental, the Project would not be anticipated to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. No impact would occur.

V. CULTURAL RESOURCES

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those outside of formal cemeteries?	☐	☒	☐	☐

SUBSTANTIATION: *(Check if Project is located in the Cultural ☒ or Palaeontologic ☐ Resources overlays or cite results of cultural resource review).*

A *Cultural Resources Survey for the Joshua Tree Estates Project* (Appendix C-1) was prepared by BFSA Environmental Services, a Perennial Company dated May 21, 2023 (updated June 12, 2025 Appendix C).

The cultural resources assessment of the Project consisted of an institutional records search, archival research, an intensive cultural resource survey of the entire 80.2-acre study area, and the preparation of this technical report. This study was conducted in conformance with Section 21083.2 of the California Public Resources Code and CEQA. Statutory requirements of CEQA (Section 15064.5) were followed for the identification and evaluation of resources.

The updated cultural resources survey was conducted on June 4, 2025, under the direction of Principal Investigator Tracy A. Stropes, M.A., RPA. Methodology employed during the current investigation followed standard archaeological field procedures and was sufficient to accomplish a thorough survey of the Project and are discussed further in Appendix C.

The vegetation across the landscape primarily consisted of creosote bushes, wildflowers, and sage (Plates 3.2–1 and 3.2–2 of Appendix C). Ground visibility during the survey was considered moderate to good. However, accumulated wind-swept soil hindered ground visibility around the bases of creosote bushes.

a) **Less than Significant with Mitigation Incorporated**- The results of the cultural resources survey update for the Project are consistent with the 2023 BFSA findings. Sites Temp-1 and Temp-2 within the subject property are not significant and ineligible for listing on the CRHR. Therefore, site-specific mitigation measures would not be required. However, based upon constraints resulting from partially limited ground visibility and the previously identified prehistoric and historic resources within the Project vicinity, future grading within the subject property may impact cultural resources that have not been previously identified. Because the potential exists that inadvertent discoveries could be made during grading or earthwork. Mitigation Measure **CUL-4** below would require archaeological monitoring during ground-disturbing activities tied to the future residential development of the property. However, during

grading, the consulting archaeologist shall have the authority to modify and reduce the monitoring program to either periodic spot-checks or suspension of the monitoring program if the potential for cultural resources appears to be less than anticipated.

b) **Less than Significant with Mitigation Incorporated** - BFSA conducted an archaeological records search for a one-mile radius around the Project from the SCCIC at CSU Fullerton. The SCCIC records search identified 10 cultural resources within one mile of the Project, two of the resources consisting of a historic trash scatter with cistern (Site Temp-1) and a historic trash scatter (Temp-2) are located within the subject property. The remaining resources identified during the search include one prehistoric lithic scatter, three prehistoric isolates, one multicomponent site, one historic trash scatter, and two historic isolates as demonstrated in Table 1.4-1 of Appendix C. The records search results also identified seven cultural resources studies that have been conducted within one mile of the Project. The BFSA survey of the property resulted in the identification of the two historic archaeological sites (Temp-1 and Temp-2). Site Temp-1 consists of a cistern and a historic artifact scatter at the location where structures are visible on aerial photographs between 1953 and 1989. Site Temp-2 is a historic artifact scatter just northwest of the intersection of 3rd Street and Sunever Road. The site assemblage primarily consists of cans, metal, and glass fragments. Following identification of sites Temp-1 and Temp-2, BFSA conducted a Phase II testing and evaluation study of the resources. This included the detailed recordation of each site on Department of Parks and Recreation (DPR) site record forms, the collection of a representative sample of surface artifacts, and shovel test pit (STP) excavations at each of the sites. The artifact assemblage for Site Temp-1 was found to date between the late 1960s and 1970s. The assemblage for Site Temp-2 was found to date between the late 1950s and 1960s. No significant intact cultural materials were recovered from the surface examinations or subsurface tests, and sites Temp-1 and Temp-2 were determined to be not CEQA-significant and not eligible for listing on the CRHR. Mitigation measures below would reduce Impacts to archaeological resources to less than significant.

c) **Less than Significant with Mitigation Incorporated** – No formal cemeteries were identified on the Project site however, inadvertent discoveries can occur. Should human remains be discovered, treatment of these remains shall follow California Public Resources Code 5097.9. Any human remains that are determined to be Native American shall be reported to the San Bernardino County Coroner and subsequently to the NAHC. These recommendations are consistent with the 2023 BFSA recommendations (Garrison 2023).

Out of an abundance of caution, the following mitigation measures are recommended to reduce impacts of inadvertent discoveries of cultural resources and human remains:

Mitigation Measures

CUL-1: In the event that cultural resources are discovered during Project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the Project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed within TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

CUL-2: If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the Project and implement the Plan accordingly.

CUL-3: If human remains or funerary objects are encountered during any activities associated with the Project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the Project.

CUL-4: A qualified archaeologist shall be present during ground disturbance activities occurring for throughout all construction phases of the Project. The qualified archaeologist shall have the authority to modify and reduce the monitoring program to either periodic spot-checks or suspension of the monitoring program if the potential for cultural resources appears to be less than anticipated.

VI. ENERGY

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a State or Local Plan for renewable energy or energy efficiency?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact** – The Project proposes to utilize Southern California Edison (SCE) as the source of Electrical Energy, confirmed Service is available and Will-Serve Letter has been obtained.

Propane is planned to be used as Natural Gas for the Project. California's energy efficiency standards for residential buildings are defined in Title 24, Part 6 of the California Code of Regulations, also known as the Building Energy Efficiency Standards. Title 24, Part 6 sets mandatory requirements and prescriptive measures to ensure buildings are designed and constructed to meet specific energy efficiency goals. The 2025 Energy Code focuses on encouraging electric-ready buildings to set up owners to use cleaner electric water heating and cooking when they are ready to invest in those technologies. Voluntary energy efficiency provisions in CAL Green (Title 24, Part 11).

The proposed Project would require energy resources during both construction and operational phases.

Construction of the proposed residential development would require the typical use of energy resources. There are no unusual Project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities; or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment employed in construction of the Project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

The largest source of operational energy use would be vehicle operation of residents. The site is located in a rural area. Vehicle trips generated by the Proposed Project are consistent with other similar residential uses of similar scale and configuration as reflected in the traffic assessment for the Project. That is, the Proposed Project does not propose uses or operations that would inherently result in excessive and wasteful vehicle trips, nor associated excess and wasteful vehicle energy consumption. Therefore, Project transportation energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

Electricity

The Project proposes the subdivision of a parcel into a 32 lot lots that would allow for the development of 32 single-family residences. In 2024, the residential sector of the Southern California Edison planning area consumed 27,131 GWh of electricity for residential use[6]. The proposed 32-lot subdivision would result in the construction of 32 new single-family homes and would not result in a significant increase in electrical demand with the typical single family home estimated electricity demand at approximately 0.011 GWh per home/per year.[7] The CalEEMod data projected that the residential uses would consume approximately 243,508 kWh/year for operational related activities for the 32 units which is approximately 0.2435 GWh, an inconsequential increase in electricity demand.

Natural Gas

The Project site is located within the service area of Southern California Gas (SoCal Gas). The Proposed Project's estimated annual natural gas demand is 12,812.76 therms. The Proposed Project would create a permanent increase demand for natural gas. According to the California Energy Commission, the natural gas consumption of the SoCalGas residential sector was 2,150 MM therms (millions of therms) in 2024.[8] The Proposed Project's estimated annual natural gas consumption, using the output from CalEEMod, compared to the 2024 annual natural gas consumption of the overall residential sector in the SoCal Gas Planning Area would account for approximately 0.00005632 percent of the total natural gas consumption. Therefore, projected natural gas demand would result in a less than significant impact to SoCal Gas level of service.

Construction shall be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday in accordance with the County of San Bernardino Development Code standards. No construction activities are permitted outside of these hours or on Sundays and Federal holidays. The Proposed Project would be conditioned to comply with Greenhouse Gas (GHG) operational standards during temporary construction. Adherence would ensure that there would not be a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation. Less than significant impacts are anticipated, and no mitigation measures are required.

b) **Less than Significant Impact**– Regarding the State's Energy Plan and compliance with Title 24 CCR energy efficiency standards, the applicant is required to comply with the California Green Building Standard Code requirements for energy efficient buildings and appliances as well as utility energy efficiency programs implemented by the SCE.

Regarding the State's Renewable Energy Portfolio Standards, the Project would be required to meet or exceed the energy standards established in the California Green Building Standards Code, Title 24, Part 11 (CALGreen). CALGreen Standards require that new buildings reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting

[6] California Energy Commission 2024. California Electricity Consumption Dashboard, Data last updated Data last updated January 27, 2026, accessed May 7, 2026 from Electricity Consumption.
[7] U.S. Energy Information Administration, accessed May 8, 2026, Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA)
[8] California Energy Commission 2024. California Natural Gas Consumption Dashboard, Data last updated January 27, 2026, Accessed May 7, 2026 from Natural Gas Consumption

finish materials. Therefore, the proposed Project would have a less than significant impact on renewable energy and no mitigation measures are required.

Mitigation Measures: None.

Monitoring: None.

VII. GEOLOGY AND SOILS

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map Issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv. Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable because of the Project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☒	☐
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

SUBSTANTIATION: *(Check if Project is located in the Geologic Hazards Overlay District ☐).*

a)

i) **Less than Significant Impact.** According to the United States Geological Survey (USGS), U.S. Quarternary Faults Map[9] the nearest fault to the Project site, the Pinto Mountain Fault and is approximately 2.0 miles south of the Project site, which is also the nearest Alquist Priolo fault zone[10]. Although the potential for rupture on-site cannot be dismissed, it is considered low due to the absence of known faults within the Project parcel or immediate vicinity. Nonetheless, the Proposed Project would be required to comply with the California Building Code requirements and the Uniform Fire Code requirements and all applicable statutes, codes, ordinances, and standards of the San Bernardino County Fire Department. Compliance with the California Building Codes and Uniform Fire Code requirements and all applicable statutes, codes, ordinances, and standards of the San Bernardino County Fire Department would address potential impacts resulting from an earthquake event. Therefore, a less than significant impact is expected, and no mitigation measures are required.

ii) **Less Than Significant Impact.** As is the case for most areas of Southern California, ground shaking resulting from earthquakes associated with nearby and more distant faults may occur at the Project site. The design of any structures on-site would incorporate measures to accommodate projected seismic ground shaking in accordance with the California Building Code (CBC) and local building regulations. The CBC is designed to preclude significant adverse effects associated with strong seismic ground shaking. Compliance to the CBC would ensure potential impacts are reduced to a less than significant and the Proposed Project would not expose people or structures to substantial adverse effects, including loss, injury or death, involving seismic ground shaking. Therefore, Therefore, a less than significant impact is expected, and no mitigation measures are required.

iii) **No Impact**. Liquefaction is a process in which cohesion-less, saturated, fine-grained sand and silt soils lose shear strength due to ground shaking and behave as fluid. The Project site is not located in an area susceptible to liquefaction as demonstrated by Hazards Map HZ-2 *Liquefaction & Landslides* of the Hazards Element of the Countywide Plan.[11] Therefore, no impact is identified or anticipated, and no mitigation measures are required.

iv) **No Impact**. Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. The Project site is not located in an area susceptible to liquefaction as demonstrated by Hazards Map HZ-2 *Liquefaction & Landslides* of the Hazards Element of the Countywide Plan.[12] Therefore, no impact is identified or anticipated, and no mitigation measures are required.to the California Department of Conservation, Earth. Therefore, no impact is identified or anticipated, and no mitigation measures are required.

b) **Less than Significant Impact** - According to the Geotechnical Investigation prepared by Sladden Engineering dated January 5, 2023 (Appendix D), the Project site consists of alluvium consisting of silty sand and sand was encountered to a depth of approximately 26 feet below ground surface (bgs). It appears to be dry to slightly moist, loose to very dense, and fine to coarse grained with gravel. No signs of flooding or erosion were observed during the field visit.

[9] United States Geological Survey, USGS Interactive Fault Map USGS Quaternary Fault Application Accessed May 6, 2026
[10] Countywide Plan Hazards Element Map HZ-1 Earthquake Fault Zones, HZ-1 Earthquake Fault Zones
[11] Countywide Plan Hazards Element Map HZ-2 Liquefaction & Landslides HZ-2 Liquefaction & Landslides
[12] Countywide Plan Hazards Element Map HZ-2 Liquefaction & Landslides HZ-2 Liquefaction & Landslides

Risks with flooding and erosion should be evaluated and identified by the Project Civil Engineer. Less than significant impact would occur.

c) **Less than Significant Impact** – No signs of slope instability in the form of landslides, rock falls, earthflows, or slumps were observed at or near the subject site. The site location is on relatively level ground and not immediately adjacent to any hillsides. Based on the field investigation risks associated with slope instability should be considered negligible.

Subsidence can occur in valleys where aquifer systems have been subjected to extensive groundwater pumping. No fissures or other surficial evidence of subsidence were observed at or near the subject site. The potential for subsidence-related settlement is considered negligible. Less than significant impact would occur.

d) **Less than Significant Impact** – Expansive soils are composed of fine-grained silts and clays which are subject to swelling and contracting. The amount of swelling and contracting is subject to the amount of fine-grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Much of the Desert Region of the County has low to moderately expansive soils.[13] According to the Geotechnical & Sewage Disposal Feasibility Report (Appendix E-1) prepared by Sladden Engineering May 6, 2025, and the approved Percolation Report (Appendix E-2), Sladden Engineering prepared January 10, 2023, the onsite surface soil is non-expansive and falls within the "very low" expansion category in accordance with 2025 California Building Code (CBC) classification criteria. Slab thickness and reinforcement should be determined by the structural engineer. We recommend a minimum floor slab thickness of 4.0 inches and minimum reinforcement of #3 bars at 24 inches on center in both directions. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height. The materials underlying the site are considered to have negligible expansion potential. Less than significant impact would occur.

e) **Less than Significant Impact –** Percolation testing was conducted to assess the feasibility of on-site sewage disposal. For detailed information, refer to Geotechnical & Sewage Disposal Feasibility Report (Appendix E-1), and the approved Percolation Report (Appendix E-2).

The purpose of this information is to verify that the criteria resulting from the Project's percolation testing remain accurate. The study states that “Leach Lines may be used for the Sewage Disposal on this Property”. The findings and recommendations presented in the Percolation Report (Appendix E-2) are based upon an interpolation of the soil conditions between bore locations and extrapolation conditions throughout the sewage disposal area. Less than significant impact would occur.

Recommended OWTS Design recommendations are presented in Table VII-1 Below.

[13] San Bernardino Countywide Policy Plan draft EIR Chapter 5.6 Geology and Soils

Table VII-1 Onsite Wastewater Treatment System: Standard Design (3ft of Gravel Below Leach Lines)[14]

Number of Bedrooms	1-2	3	4	5-6
Application Rate (ft^2/gal/day)	0.83	0.83	0.83	0.83
Gallons of Effluent per Day	500	670	800	1,000
Gallons of Septic Tank Capacity	750	1,000	1,200	1,500
Absorption Area (ft^2)	415	556	664	830
Trench Credit (ft^2 per ft)	7	7	7	7
Total Leach Line (ft)	60	80	95	119
Number of Leach lines	2@30 ft	2@40 ft	2@48 ft	3@40 ft

Based on the data presented in the Percolation Report (Appendix E-2) Sladden Engineering concludes that leach lines may be used for sewage disposal for the Project. Also, the groundwater table should not encroach the allowable limit set forth by the County and State requirements when the recommendations are followed. There also appears to be sufficient area on each parcel for the proposed on-site sewage disposal system and future expansion. Less than significant impact would occur.

f) **Less than Significant Impact –** A Paleontological Assessment for the Project was prepared by BFSA dated May 31, 2023, Appendix E-3, and the Paleontological update letter provided June 17, 2025, Appendix E-4 included a review of paleontological literature and fossil locality records, and a review of the Project site's underlying geology.

The County of San Bernardino 2007 Development Code has developed criteria for applying guidelines to preserve and protect nonrenewable paleontological resources (County of San Bernardino 2019). In Chapter 82.20, "Palaeontologic Resources (PR) Overlay," of the Development Code, Purpose, Location Requirements, Development Standards, and Paleontologist Qualifications are described in Sections 82.20.010 through 82.20.040, respectively (County of San Bernardino 2019).

The County of San Bernardino applies its PR Overlay guideline to those areas where paleontological resources are known to occur or are likely to be present, by using fossil location criteria reported by the San Bernardino County Museum, the University of California Museum of Paleontology (Berkeley), the Los Angeles County Natural History Museum, or other institutions (County of San Bernardino 2019, Section 82.20.020)[15]. Since a low to undetermined paleontological resource sensitivity has been, and can be, applied to the geologic strata beneath the Project site (Society of Vertebrate Paleontology 2010), and no known significant fossil resources have been found in the area of the Project (Section IV, and above), the application of the County's PR Overlay criteria (Section 82.20.030) is not applicable.

The existence of mostly young alluvial deposits rocks at the Project, and the lack of any known significant fossil specimens or fossil localities from within three miles of the Project site, and the shallow earth disturbance activities typically required for this type of development support the recommendation that paleontological monitoring not be required for the Project. Therefore, it is not anticipated that the Project would directly or indirectly destroy

[14] Approved Percolation Report, Appendix E-2, Sladden Engineering, January 10, 2023
[15] San Bernardino County Development Code CHAPTER 82.20: PALEONTOLOGIC RESOURCES (PR) OVERLAY

a unique paleontological resource or site or unique geologic feature. Impacts would be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

VIII. GREENHOUSE GAS EMISSIONS

Would the Project:	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Generate greenhouse gas emissions either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.	☐	☐	☒	☐

SUBSTANTIATION:

a) Less than Significant Impact – PGN Consultants prepared the Joshua Tree Estates Project Tentative Tract Map TTM 20668 (Residential) Air Quality Impact and *CalEEMod Runs*, March 11, 2026 (Appendix A).

Construction

The greenhouse gas (GHG) emissions from Project construction equipment and worker vehicles are shown in Table VIII-1. The emissions are from all phases of construction. The total construction emissions amortized over a period of 30 years, as required by the California Energy Commission (CEC), are estimated at 17.28 metric tons of CO_2e per year.

TABLE VIII-1: CONSTRUCTION GREENHOUSE GAS EMISSIONS

		Metric Tons Per Year				
	Bio-CO_2	**NBio-CO_2**	**Total CO_2**	**CH_4**	**N_2O**	**CO_2e**
Total	0.00	516.14	516.14	0.02	0.005	518.42
Annualized Construction						**17.28**

Notes:
1. $MTCO_2e$=metric tons of carbon dioxide equivalents (includes carbon dioxide, methane and nitrous oxide).
2. The emissions are averaged over 30 years.
* CalEEMod output 2022.1.1.39

Operations

Operational emissions occur over the life of the Project. Table VIII-2 below shows that the subtotal for the proposed project would result in annual emissions of 709.20 $MTCO_2e$ per year (without the addition of amortized construction emissions which would add an additional 17.28 $MTCO_2e$ per year). The total emissions of 726.48 $MTCO_2e$/year would not exceed the San Bernardino County screening threshold of 3,000 $MTCO_2e$. As shown in Table VIII-2, the Project's total GHG emissions would also not exceed the MDAQMD annual threshold of 100,000 $MTCO_2e$ or the MDAQMD daily threshold of 548,000 pounds of CO_2e.

TABLE VIII-2: PROJECT-RELATED GREENHOUSE GAS EMISSIONS

Emission Source	Emissions (MT/yr) CO_2e
Annual construction-related emissions amortized over 30 years	17.28
Mobile Source	589.39
Area Source	0.39
Energy Source	112.25
Water Usage	0.00
Waste	7.10
Refrigerants	0.07
Total CO_2e (All Sources)	**726.48**
MDAQMD GHG Threshold	**100,000**
San Bernardino County Screening Threshold	**3,000**
Exceeds Threshold?	**NO**

b) **Less than Significant Impact -** The proposed Project would have the potential to conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing GHG emissions.

According to the San Bernardino County Greenhouse Gas Emissions Reduction Plan, "all development projects, including those otherwise determined to be exempt from CEQA would be subject to applicable Development Code provisions, including the GHG performance standards, and State requirements, such as the California Building Code requirements for energy efficiency. With the application of the GHG performance standards, projects that are exempt from CEQA and small projects that do not exceed 3,000 $MTCO_2e$ per year would be considered to be consistent with the Plan and determined to have a less than significant individual and cumulative impact for GHG emissions." The Reduction Plan also states that "the 3,000 $MTCO_2e$ per year value was chosen as the medial value and is used in defining small projects that must include the Performance Standards as described in Attachment B (of the San Bernardino County Greenhouse Gas Emissions Reduction Plan), but do not need to use the Screening Tables or alternative GHG mitigation analysis described in Attachment D (of the San Bernardino County Greenhouse Gas Emissions Reduction Plan)."[16]

The Project's total net operational GHG emissions do not exceed the County's screening threshold of 3,000 $MTCO_2e$ per year. According to the County of San Bernardino's (GHGRP) Greenhouse Gas Reduction Plan Update 2021, the point levels for Residential Projects are based on improvements compared to 2016

emissions levels of efficiency. Residential Projects that garner at least 100 points would be consistent with the reduction quantities anticipated in the GHG Reduction Plan Update.

[16] San Bernardino County Greenhouse Gas Reduction Plan, June 2021. Page 5

The County of San Bernardino County Greenhouse Gas Emissions Screening Table (Appendix A-1), for Residential Projects was completed by the Project proponent, earning a Total of 123 Points. The Project is expected to comply with the performance standards for residential uses and shall implement the Screening Table Measures that total 123 points, thus exceeding the required minimum 100 points per the County Screening Tables. As a result, the project is considered to have a less than significant individual and cumulatively considerable impact on GHG emissions. As a result, the impacts would be less than significant.

The proposed Project would not result in substantial emissions of greenhouse gases, and impacts would be less than significant.

Mitigation Measures: None.

Monitoring: None.

IX. HAZARDS AND HAZARDOUS MATERIALS

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard or excessive noise for people residing or working in the Project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people to structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

SUBSTANTIATION:

a) **Less than Significant Impact.** The Proposed project is the development single-family housing on the proposed 32 lots. Construction of the Proposed Project would require the routine transport, use, storage, and disposal of limited quantities of common household hazardous materials such as gasoline, diesel fuel, oils, solvents, paint, fertilizers, pesticides, and other similar materials. All materials required during construction would be kept in compliance with State and local regulations and BMPs. Although these materials could be stored on-site during construction activities, the Proposed Project would be required to comply

with the guidelines established by the Storm Water Pollution Prevention Plan (SWPPP) developed by the contractor and submitted to the RWQCB. The management of hazardous materials during the proposed Project's construction phase would result in a less than significant impact a less than significant would occur.

b) **Less than Significant Impact** - Through the construction process, any hazardous materials used on-site would be handled and stored in accordance with all Federal, State and County regulations. As noted in response a), residences would store and use various chemicals for routine housekeeping and landscaping maintenance. However, none of these chemicals would be used in sufficient quantities to pose a threat to humans or the environment. Because quantities of hazardous materials used and stored on-site would be minimal, a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials is not anticipated. Additionally, any hazardous materials would be delivered, handled and stored in compliance with all Federal, State, County regulations. Therefore, a less than significant impact would occur.

c) **No Impact** – The nearest school to the Project site is the Joshua Tree Elementary School approximately 2 miles to the west at the southwest corner of Broadway and Sunburst. There are no existing schools or known future school sites within one-quarter mile of the Project site. No Impact anticipated.

d) **No Impact -** Pursuant to Government Code Section 65962.5, the Department of Toxic Substances Control (DTSC) and the State Water Resources Control Board (SWRCB) maintain publicly accessible, regularly updated lists of sites with known hazardous substance contamination. A review of these databases found no active hazardous waste violation cases within the Project area. No Impact.

e) **No Impact** - From the Project area, the Yucca Valley Airport is located approximately 8.5 miles to the west. The Project is not located within the boundary of the airport's land use plan, nor is it affected by noise from airport or base activities. No Impact is expected.

f) **Less than Significant Impact** - The Project would comply with the Uniform Fire Code for emergency access during construction and operation. As designed site access would be provided via multiple access points. The Project site is bordered on the north by East Broadway, on the east by Sunever Road, on the south by Saphire Street, and on the west by Laferney Avenue. Most dwelling units along these roadways would connect directly with them. Additionally, the project proposes three (3) new roadways parallel to Laferney Avenue and Sunever Road, each connecting East Broadway and Saphire Street. Dwelling units constructed along the new roadways would connect with the proposed roadways. There are no site design features that would hinder emergency access to the site. The final map as well as individual home building plans would be reviewed by county fire as part of the permitting process and would ensure that no features would result in putting the public at risk of obstructing emergency access into or out of the site. Less than significant impacts are expected, and no mitigation measures are required.

g) **No Impact** - The Project site is within a moderate Fire Hazard Severity overlay, or Wildland Fire Interface, and in a Local Responsibility Area (LRA), according to CalFire,[17] and Countywide Plan Hazards Element Map HZ-5: *Fire Hazard Severity Zones*. It is possible that the Project site and surrounding properties could be subject to grass and building fires. Project

[17] Fire Hazard Severity Zone Viewer

implementation would not introduce a new exposure to people or structures to a significant risk of loss, injury or death involving wildland fires. All projects in fire hazard severity zones shall be designed, built, and operated in accordance with state regulations specifying building materials and structural designs for structures in such zones, including California Building Code Chapter 7A and California Fire Code (CFC) Chapter 49; and regulatory requirements for defensible space including California Public Resources Code Sections 4291 et seq. and San Bernardino County Code of Ordinances Sections 23.0301.[18]

The Proposed Project is subject to review and approval from the San Bernardino County Fire Marshal. All new construction shall comply with the current Uniform Fire Code requirements and all applicable statues, codes, ordinances, and standards of the San Bernardino County Fire Department. Therefore, less than significant impacts are identified or anticipated, and no mitigation measures are required. Less than Significant impacts are anticipated, and no mitigation measures are required.

Mitigation Measures: None.

Monitoring: None.

[18] San Bernardino Countywide Policy Plan Draft EIR. Hazards and Hazardous Materials. Ch_05-08-HAZ.pdf

X. HYDROLOGY AND WATER QUALITY

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. Result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite?	☐	☐	☒	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of runoff?	☐	☐	☒	☐
iv. impede or redirect flood flows?	☐	☐	☒	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?	☐	☐	☐	☒
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact** - The Preliminary Hydrology Study, Adkan Engineers, 11/20/2024, revised 8/21/2025 (Appendix D), and Preliminary Mojave River Watershed Water Quality Management Plan (WQMP), Adkan Engineers, 9/15/2025 (Appendix D-1) have been consulted in order to obtain information regarding the hydrology, water quality and wastewater standards and Best Management Practices (BMPs) for the site.

The existing drainage pattern for the site is characterized by sheet flows that follow the slope to the northeast. The site is traversed by various unnamed ephemeral streambeds which flow from in a southwesterly direction toward the northeast of the Project site. All flows in this area are ultimately conveyed to the Sunfair Dry Lakebed, a basin with no outlet, lying approximately 3.5 miles northeasterly from the subject property.

The Project site is impacted by offsite flows conveyed through four ephemeral streambeds running more or less parallel to each other from the southwest toward the northeast. Onsite streets would collect flows and direct them to the northeast corner of the site at East Broadway and Sunever Road via a series of culverts connecting a trapezoidal channel along East Broadway. Individual lot flows would be captured in an infiltration trench on each lot, which would be privately owned and maintained.

The WQMP is intended to comply with the requirements of the County of San Bernardino and the Phase II Small MS_4 General for the Mojave River Watershed. The Project proponent, while they own the subject property, is responsible for the implementation of the provisions of this plan and would ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the Phase II Small MS_4 Permit and the intent of the NPDES Permit for San Bernardino County (see Appendix D-1).

Development of the proposed Project would disturb more than one acre of soil; therefore, the proposed Project is subject to the requirements of the State Water Resources Control Board General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-2009-DWQ). Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation. The Construction General Permit requires the development and implementation of a SWPPP. The SWPPP must list BMPs to avoid and minimize soil erosion. Adherence to construction BMPs is anticipated to ensure that the Proposed Project does not result in substantial erosion or siltation on- or off-site. Examples of BMPs include i.e., sandbag barriers, geotextiles, storm drain inlet protection, sediment traps, rip rap soil stabilizers, sweep roadway from track-out, and rumble strips. BMPs applicable to the Proposed Project would be subject to County approval and provided in contract bid documents.

Best Management Practices (BMP) measures for pollutant generating activities and sources during operations of the Project shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment (or an equivalent manual). Pollutant generating activities must be considered when determining the overall pollutants of concern for the Project as presented in Appendix D-1 *Section 2.3 Potential Stormwater Pollutants*, form 2.3-1 *Pollutants of Concern.* Low Impact Development Best Management Practices (LID BMPs) would include[19]:

- *Education of property owners, tenants and occupants on stormwater BMPs:* Practical educational materials would be provided to the first property owners/tenants outlining general housekeeping practices that contribute to the protection of stormwater quality. Afterward, such materials would then be available through the local jurisdiction's stormwater education program. Activity restrictions: CCRs would be prepared by the developer to restrict activities that may have an adverse impact on stormwater quality. Vehicle washing would be prohibited outside of designated car washing facilities. When using pesticides, contact licensed pesticide applicator to do the application.

- *Landscape Management BMPs:* Property owners/tenants/occupants would follow all federal, state and local laws and regulations governing the use, storage and disposal of fertilizers and pesticides and training of applicators and pest control advisors. Pesticide application would only be performed under the supervision of a California qualified pesticide applicator.

- *Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12):* Landscape design would include water efficient plant pallettes and efficient irrigation systems recommended by a landscape architect to minimize excess irrigation and irrigation runoff.

- *Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement:* Landscape pockets, fingers, setback areas, etc. would have a finished grade 1-2 inches below top of curb to increase retention and infiltration of stormwater and irrigation water.

- *Local water quality ordinances:* Property owners/tenants/occupants would be informed that compliance with all applicable local water quality ordinances is required and would be completed through this WQMP.

- *Uniform Code Implementation:* Property owners/tenants/occupants would be informed that compliance with Article 80 of the Uniform Fire Code is required.

- *Litter/Debris Control Program:* Property owner shall implement trash management and litter control procedures aimed at reducing pollution of drainage water. Site inspection would occur daily and during landscape maintenance. Trash would be cleaned as needed.

- *Vacuum Sweeping of Private Streets and Parking Lots:* Vacuum sweeping of parking lots would be performed on an annual basis at minimum prior to the start of the rainy season or as required by the local jurisdiction.

With the implementation of BMPs, as well as County Land Development Division review and approval, impacts are expected to be less than significant

b) **Less than Significant Impact** - During the field investigation for the Geotechnical Report (Appendix E-1), groundwater was not encountered. Information regarding the approximate depth to groundwater provided by the California Department of Water Resources online database indicates the historic high depth to groundwater is in excess of 200 feet below the existing ground surface in the vicinity of the site. Potable water would be provided by the Joshua Basin Water District as stated in the Will serve letter provided October 24, 2026. An updated letter would be obtained prior to building permit issuance. With the implementation of BMPs outlined in Appendix D-1 *Section 4.1.2 Site Design form 4.1-3 Site Design Practices Checklist,* as well as County Land Development Division review and approval impacts to groundwater are expected to be less than significant

c) **Less than Significant Impact** - substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. Per the FEMA FIRM Map Panel 06071C8145J, the Project site lies within the Zone X designation. These are areas determined to be outside of the 0.2% annual chance floodplain. The Project site would be designed to minimize the impact to the existing flow paths. The homes would be constructed in such a way to allow the existing tributary flows to pass through the project unobstructed and would be conveyed past streets with channel crossings per San Bernardino County Department of Public Works standard drawing 200A. Each lot would be constructed with ornamental landscaping to minimize erosion and maximize flow interception for evapotranspiration and infiltration. Additionally, the Project would implement the following LID BMPs measures to reduce the rate and amount of surface runoff:[20]:

- Minimizing lot areas of imperviousness to 65%, would be utilized to reduce any potential impact to ess than significant impacts to substantial erosion, or siltation on or offsite.
- Runoff on lots would drain to the infiltration trenches on each lot.
- Existing site is barren and lots would remain undeveloped with the exception of the pad. Existing vegetation and Joshua Trees would remain undisturbed in the undeveloped portions of the site.
- Graded areas of landscape would be staked off during construction to reduce compaction.

Less than significant impacts are expected

ii. Per Appendix D, the proposed storm drain facilities demonstrate the ability to convey the Rational Hydrology Method 10-, 25-and 100-year storm events as required by the San Bernardino County Flood Control Hydrology Manual. Therefore, the Project would not significantly impact the local community or watershed goals and does not adversely affect downstream facilities while maintaining the adequate conveyance of storm flows for on-site facilities to the criteria for the protection of storm flow. Less than significant impacts are expected.

iii. Streets would be constructed to match the existing grade to the greatest extent possible and convey runoff to proposed channel crossings. Broadway Avenue would be constructed with a series of channel crossings connecting a trapezoidal channel. There are areas where the natural drainage course conveys offsite flows through the site. These areas would be designed to limit impacts. In areas where these ephemeral streams transect private lots, a drainage easement would be recorded on the map to protect these areas from development and ensure the free passage of flows through the site. The tentative tract map identified the easements as having an undetermined width. Preliminary calculations show that the width would vary with each tributary but the maximum would likely be 30 feet wide. This information would be updated during the preparation of construction documents and the final map specific to each reach. Preliminary rough grading showing proposed easements and layout can be seen in detail in Appendix D, *Hydrology Report.*

iv. The proposed Project consists of 32 single-family residential homes. The Project site would be designed to minimize the impact to the existing flow paths. The homes would be constructed in such a way to allow the existing tributary flows to pass through the

Project unobstructed, and would be conveyed past streets with channel crossings per San Bernardino County Department of Public Works standard drawing 200A. Streets would be constructed to match the existing grade to the greatest extent possible and convey runoff to these proposed crossings. Broadway Avenue would be constructed with a series of channel crossings connecting a trapezoidal channel. Impacts would be less than significant.

d) **No Impact** - Due to the inland distance from the Pacific Ocean and any other significant body of water, tsunamis and seiches are not potential hazards in the vicinity of the Project site. The closest body of water to the Project site is Big Bear Lake approximately 35 miles to the west.

As mentioned, the Project site is designated as Flood Zone X and is located outside of the 0.2 percent annual chance floodplain. The first floor would be required to be elevated at a minimum of one foot above natural highest adjacent ground in compliance with San Bernardino County regulations. No impacts are identified or are anticipated, and no mitigation measures are required.

e) **Less than Significant Impact** - The Project would not directly extract groundwater; however, there would be an increase in impervious surfaces which would reduce the amount of water directly percolating into the groundwater table underlying the Project site. The Preliminary WQMP (Appendix D-1) is a post-construction management program that ensures the ongoing protection of the watershed basin by requiring structural and programmatic controls. Implementation of the proposed Project BMPs listed in the WQMP in Section 4 (Appendix D-1), would ensure that stormwater discharge does not substantially alter the existing drainage pattern and water quality, thereby allowing runoff from the proposed Project to be utilized as a resource that can eventually be used for groundwater recharge. The proposed Project would not otherwise substantially degrade water quality as appropriate measures relating to water quality protection would be implemented.

The Preliminary WQMP (Appendix D-1) is subject to review and approval by the County for compliance with water quality permit objectives. Therefore, the Proposed Project would not conflict or obstruct implementation of a water quality control plan or implementation of a groundwater sustainability plan. Less than significant adverse impacts are identified or anticipated, and no mitigation measures are required with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Mitigation Measures: None required.

Monitoring: None required.

XI. LAND USE AND PLANNING

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Physically divide an established community.	☐	☐	☒	☐
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact** - The physical division of an established community generally occurs when a Project introduces a linear feature such as a major highway or railroad or removes an existing means of access, such as a local road or bridge, thereby reducing mobility within a community or between a community and surrounding areas. The Project does not involve the construction of any linear features or the removal of existing access routes. Therefore, the Project would not physically divide an established community. Less than Significant Impact anticipated.

b) **Less than Significant Impact -** The Project does not propose uses that would conflict with the allowable land uses or development standards, nor does it introduce activities that would result in significant policy inconsistencies. The Project site has a Policy Plan land use designation of Rural Living (RL) and is zoned Joshua Tree/Rural Living 2.5 min lot size (JT/RL). As such, the Project would not conflict with any adopted land use plans, policies, or regulations intended to avoid or mitigate environmental impacts. Less than significant impacts are expected, and no mitigation measures are required.

Mitigation Measures: None.

Monitoring: None.

XII. MINERAL RESOURCES

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Result in the loss of availability of a known mineral resource that would be a value to the region and residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan of other land use plan?	☐	☐	☐	☒

SUBSTANTIATION:

a-b) **No Impact** - According to the Department of Conservation California Geological Survey[21], the Project site is not located within a mineral classification-designation. Also, the Project site is not located within a mineral resource zone according to the Countywide Plan Natural Resources Element Map NR-4 *Mineral Resource Zones*[22]. No Impact anticipated.

Mitigation Measures: None.

Monitoring: None.

California Department of Conservation Open Data and Maps. California Department of Conservation: Open Data and Map Access Accessed May 6, 2026

[22] Countywide Plan/Policy Plan 2020 Natural Resources Element Map NR-4 Mineral Resource Zones. NR-4 Mineral Resource Zones Accessed May 6, 2026

XIII. NOISE

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project more than standards established in the local General Plan or Noise Ordinance, or applicable standards or other agencies?	☐	☐	☒	☐
b) Generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c) For a Project located within the vicinity of a private airstrip or an airport Land Use Plan or, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒

SUBSTANTIATION: *(Check if the Project is in the Noise Hazard Overlay District ☐ or is the subject to severe noise levels according to the General Plan Noise Element ☐)*

a) **Less than Significant Impact** - Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subdivision (d) (Noise Standards for Stationary Noise Sources) and Subdivision (e) (Noise Standards for Adjacent Mobile Noise Sources), below in Table XIII-2 and XIII-3.

Pursuant to section 83.01.080 of the County Development Code, interior noise levels in all single-family residences shall not exceed 45 dBA Day-Night Sound Level (Ldn) emanating from sources outside the residential building.[23] The exterior noise levels in single-family residential land use areas should not exceed 60 dBA Ldn for any exterior residential use area. However, an exterior noise level of up to 65 dBA is permitted, provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technologies.

Construction

The Project site is currently surrounded by mostly vacant land with a few exceptions being three existing single family residences. One residence to the northwest approximately 185 feet from the Project site and two single family residences to the, southwest approximately 400 feet and 320 feet. Project construction activities would increase noise above ambient levels. Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as

[23] San Bernardino County. Development Code. Section 83.01.08 Noise. Accessed April 20, 2026

described in the County's Code (Section 83.01.080(g)(3)). Construction is anticipated to occur during the permissible hours (7 AM to 7 PM) according to the County's Code. Typical construction equipment noise level are provided below in Table XIII-1

Table XIII-1
Typical Construction Equipment Noise Levels

Type	Typical Max Noise Level (dBA) at 50 feet
Equipment Powered by Internal Combustion Engines	
Earth Moving	
Compactors (rollers)	73-76
Front Loaders	73-84
Backhoes	73-92
Tractors	75-95
Scrapers, Graders	78-92
Pavers	85-87
Trucks	81-94
Materials Handling	
Concrete Mixers	72-87
Concrete Pumps	81-83
Cranes (movable)	72-86
Cranes (derrick)	85-87
Stationary	
Pumps	68-71
Generators	71-83
Compressors	75-86
Impact Equipment	
Type	**Typical Max Noise Level (dBA) at 50 feet**
Saws	71-82
Vibrators	68-82

Source: Noise Impact Study dated 12/2/2025 prepared by MD Acoustics
Note: Referenced noise levels from the Environmental Protection Agency

Construction noise would have a temporary or periodic increase in the ambient noise level above the existing level within the Project vicinity. Furthermore, best management noise reduction practices recommended below to ensure that construction activities are not disruptive to neighboring properties are provided to further reduce construction noise. The impact is considered less than significant.

Best Noise Reduction Practices

1. Construction shall occur during the permissible hours as defined in Section 83.01.080(6)(3).
2. During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.
3. The contractor shall locate equipment staging areas that would create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the Project site during all Project construction.
4. Idling equipment shall be turned off when not in use.
5. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

Operation

Stationary sources of noise may occur from all types of land uses. Residential uses would generate noise from landscaping, maintenance activities, and air conditioning systems. Noise generated by residential use is generally short and intermittent.[24] According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the Project would result in exposure to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.[25] The Project would be required to meet all noise standards and design features as outlined in the County Development Code through conditions of approval.

The County Development Code (Development Code) Section 83.01.080, Noise, establishes standards concerning acceptable noise levels for both noise-sensitive land uses and noise-generating land uses. Noise limits based on the receiving land use are shown in Table XIII-2 Noise Standards for Stationary Noise Sources.[26] Areas are designated “noise impacted” if exposed to existing or projected future exterior noise levels exceeding these standards.

Table XIII-2
Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7:00 AM-10:00 PM L_{eq}	10:00 PM-7:00 AM L_{eq}
Residential	55 dBA	45 dBA
Professional Services	55 dBA	55 dBA
Other Commercial	60 dBA	60 dBA
Industrial	70 dBA	70 dBA

Source: Noise Impact Study (Appendix H) dated 12/2/2025 prepared by MD Acoustics

[24] San Bernardino Countywide Plan Draft PEIR page. 5.12-27 Accessed 4.21.26
[25] San Bernardino Countywide Plan Draft PEIR page. 5.12-27 Accessed 4.21.26
[26] San Bernardino Countywide Plan Draft PEIR page. 5.12-8 Accessed 9.24.25

Table XIII-3
Noise Standards for Adjacent Mobile Noise Sources

Land Use		Ldn (or CNEL) dB(A)	
Categories	**Use**	**Interior**	**Exterior**
Residential	Single and multi-family, duplex, mobile homes	45	60
Commercial	Hotel, motel, transient housing	45	60
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Source: Noise Impact Study (Appendix H) dated 12/2/2025 prepared by MD Acoustics

According to the Noise Impact Study (Appendix H) dated 12/2/2025 prepared by MD Acoustics, on-site operational noise includes transformers and HVAC. All HVAC equipment is likely to be located on the ground next to the residences, with one 10-ton unit per household. Equipment would be at least 185 feet away from the nearest residential property line to the northwest (across the intersection of E Broadway and La Ferney Ave). The maximum sound power level from a single unit is 80 dBA. At 185 feet away, the sound pressure level is estimated to be 37 dBA. Thus, the noise due to HVAC operations would be below 45 dBA at the residential uses and meets the County's nighttime noise level limit for residential properties. A typical residential 50 kVA transformer would be 40 dBA at a distance of 8 feet (per IEEE C57.12.20). The closest transformer would be located more than 100 feet away from the nearest residential use to the northwest. Thus, the noise due to transformer operations would be 18 dBA at the residential uses and meets the County's nighttime noise level limit for residential properties.

The proposed residences would generate noise typically associated with residential neighborhoods and in general, would not create new noise sources that exceed what is typical for residential uses. Less than significant impacts are identified or anticipated, and no mitigation measures are required.

b) **Less than Significant Impact** - There are several types of construction equipment that can cause vibration levels high enough to impact persons in the vicinity and/or result in architectural or structural damage to nearby structures and improvements. For example, a vibratory roller could generate up to 0.21 PPV at a distance of 25 feet; and operation of a large bulldozer (0.089 PPV) at a distance of 25 feet (two of the most vibratory pieces of construction equipment) as shown in Table XIII-3 below. Groundborne vibration at sensitive receptors associated with this equipment would drop off as the equipment moves away. For example, as the vibratory roller moves further than 100 feet from the sensitive receptors, the vibration associated with it would drop below 0.0026 PPV. It should be noted that these vibration levels are reference levels and may vary slightly depending upon soil type and specific usage of each piece of equipment.

Table XIII-3
Construction Equipment Vibration Source Levels

Equipment		PPV at 25ft. (in/sec)	Approximate at 25ft. (VdB)
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Clam slurry drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58
Threshold at 25 feet		**0.020**	**78**

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

Construction activity would generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches levels that can damage structures but can achieve the audible and perceptible ranges in buildings close to the construction site. Table XIII-3 lists reference vibration levels for construction equipment

According to the Noise Impact Study (Appendix H) the primary vibration source during construction may be from a vibratory roller. A vibratory roller has a vibration impact of 0.210 inches per second peak particle velocity (PPV) at 25 feet, which is perceptible but below any risk to architectural damage. At a distance of 175 feet from the nearest residential building façade to the northwest, a vibratory roller would yield a worst-case 0.025 PPV (in/sec), which is perceptible but below the threshold of architectural damage for newer residential structures (0.5 PPV (in/sec). Therefore, the impact is less than significant, and no mitigation is required.

c) **No Impact** – According the County of San Bernardino Department of Land Use Services Airport Land Use Compatibility Plans, the Community of Joshua Tree is not located withing

a designated Airport Land Use area. The nearest Airport location is Yucca Valley Airport and is approximately 8.5 miles to the west of the Project site. There would be no impact.

Mitigation Measures: None.

Monitoring: None.

XIV. POPULATION AND HOUSING

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact -** Population in the unincorporated area of the County is anticipated to increase by 39,800 between 2020 and 2040 (13.1% increase) and the average person per household was 3.41 countywide and 3.23 when limited to unincorporated areas.[27] The Project site is within unincorporated San Bernardino County and the proposed Project includes 32 detached single-family residences. Implementation of the proposed Project would generate a population growth of approximately 103 people (based on 3.23 people per household). The proposed Project would account for approximately 0.25% of the projected 20-year growth in unincorporated San Bernardino County. The Project is situated on Vacant Land designated (RL) Rural Living Residential Land Use category and the Joshua Tree/Rural Living (JT/RL) Zoning District. The Project proposes to subdivide the property into 32 individual lots designated for the development of 32 single-family residences remaining in the existing Land Use category. Therefore, population growth from the proposed Project is already anticipated from buildout of the Planning Area. Less than significant adverse impacts are identified or anticipated, and no mitigation measures are required.

b) **Less than Significant Impact** - The Project would not displace residents or cause the construction of replacement housing elsewhere. The Project site is vacant and would allow the construction of 32 single family residences helping to meet the County's housing goals, particularly Policy H-1.1 Appropriate Range of Housing: *We encourage the production and location of a range of housing types, densities, and affordability levels in a manner that recognizes the unique characteristics, issues, and opportunities for each community.*[28]

Therefore, a less than significant impact would occur, and no mitigation measures are required.

Mitigation Measures: None required.

Monitoring: None required.

[27] San Bernardino Countywide Policy Plan Draft EIR. Population and Housing. Table 5.13-5 "Adopted SCAG 2040 Growth Forecasts." Accessed April 21, 2026
[28] San Bernardino County Countywide Plan 2020, Housing Element. Housing – San Bernardino County. Accessed 4.20.26

XV. PUBLIC SERVICES

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire Protection?	☐	☐	☒	☐
Police Protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other Public Facilities?	☐	☐	☒	☐

SUBSTANTIATION:

a)

Fire Protection

Less than Significant Impact - According to the San Bernardino Countywide Plan, fire protection, and emergency medical service to the Project site are provided by the San Bernardino County Fire Protection District (SBCFPD). Fire stations that serve the Project area, include San Bernardino County Fire Station #36, located at 6715 Park Blvd, Joshua Tree, CA 92252, approximately 2.2 miles southwest of the Project site; Forestry & Fire Protection Station located at 6562 Sierra Avenue, Joshua Tree, CA 92252 approximately 2 miles south of the Project site.

As stated in the Countywide Policy Plan, new development within the unincorporated County would not combine with other development in the county to result in a cumulatively considerable impact to fire and emergency services.[29] The County would maintain sufficient services within its boundaries as well as expand to serve other incorporated jurisdictions to improve service and coverage.[30] The Proposed Project would be required to comply with County fire suppression standards and provide adequate fire access subject to County Fire Marshal approval. SBCFPD reviews staffing needs on a yearly basis and adjusts service levels as needed to maintain an adequate level of public protection. Property tax revenues provide funding to offset potential increases in the demand for fire services. The Proposed Project would receive adequate fire protection services and is not expected to result in the need for new or physical altered fire protection facilities. Therefore, less than significant adverse impacts are identified or anticipated, and no mitigation measures are required.

[29] San Bernardino Countywide Policy Plan Draft EIR: Public Services. Page 5.14-17.
[30] San Bernardino Countywide Policy Plan Draft EIR: Public Services. Page 5.14-17.

Police Protection

Less than Significant Impact - The San Bernardino County Sheriff's Department (SBCSD) services the unincorporated area of San Bernardino County. The nearest sheriff station is the San Bernardino County Morongo Basin Station located at County Sheriff's Department located at 63665 Twentynine Palms Highway Joshua Tree, CA 92252, approximately 2.1 miles south of the Project site SBCSD reviews staffing needs on a yearly basis and adjusts service levels as needed to maintain an adequate level of public protection. Increased property and sales tax associated with the direct and indirect improvement of the property would provide funding for necessary service increases to meet growth and demand. New and/or expanded sheriff stations would be required to meet the increased demand for population and employment growth over the buildout of the CWP which includes the Proposed Project. The Project is not expected to result in the requirement of police protection services that is not already anticipated by the Countywide Plan and evaluated in the Countywide Plan PEIR[31]. Therefore, less than significant adverse impacts are identified or anticipated, and no mitigation measures are required.

Schools

Less than Significant Impact - The Proposed Project would be served by Morongo Unified School District (MUSD). The school district is comprised of eleven elementary schools, two middle schools, two comprehensive high schools, one continuation high school and two alternative education programs with a total enrollment of approximately 7,300 students[32]. According to the Developer Impact Fee Analysis prepared by MUSD, impact fees to new residential development are to $5.17 per square foot of assessable space. The appropriate sum of Developer Impact Fees would be paid by the Applicant to offset impacts to schools. The student population for the proposed Project would be an estimated 62 students (0.6 x 103 persons). Payment of mandatory school fees per residential unit is mandated and the State has determined that payment of these fees is deemed sufficient to offset the Project's impacts. Therefore, less significant impacts are identified or anticipated, and no mitigation measures are required.

The nearest schools to the Project site are Joshua Tree Elementary School approximately 2.3 mi to the west, La Contenta Middle School approximately 5.0 mi to the southwest and Black Rock High School approximately 5.0 mi to the southwest. With payment of school fees to offset costs of adding the projected number of students generated by the Project, there would be less than significant impact to the school district.

Parks

Less than Significant Impact - The Project would have access to existing parks and recreational opportunities in the area, including community parks, recreational programs, and the extensive outdoor resources available in Joshua Tree National Park. The nearest park to the Project site is Sportsmans Park approximately 2.5 miles southwest of the Project, Sunburst Park approximately 2.5 miles southwest of the Project site, and Joshua Tree National Park approximately 5 miles south of the Project site.

[31] San Bernardino Countywide Policy Plan Draft EIR: Public Services. Page 5.14-25.
[32] Morongo Unified School District, Accessed May 8, 2026 from Enrollment | Morongo Unified School District

Projected population growth of the unincorporated areas of San Bernardino County is approximately 49,680 people at buildout of the Countywide Policy Plan. The unincorporated growth represents a two percent increase of potential users on existing regional park facilities, with an average annual growth rate of 0.10 percent over the planning horizon of 24 years. The amount of regional parkland in the County is 8,515 acres, which is sufficient for the parkland needs of about 3.4 million people if based on the Countywide Plan standard of 2.5 acres per 1,000 residents[33]. In the updated Countywide Policy Plan, the standard for regional parkland is replaced by an emphasis on maintaining and improving existing facilities and coordination with other jurisdictions to provide regional park land. Accordingly, no new and/or expanded facilities would need to be developed due to Countywide Policy Plan buildout, and no additional impacts would occur. Therefore, less than significant impacts are identified or anticipated, and no mitigation measures are required.

Other Public Facilities

Less than Significant Impact - Proposed Project population increase of approximately 103 persons would not increase demand for other public facilities/services, such as libraries, community recreation centers, and/or animal shelters. The Proposed Proponent would be required to pay the applicable development impact fees, property tax, and utility user tax. As such, implementation of the Proposed Project would not adversely affect other public facilities or require the construction of new or modified facilities. Less than significant impacts are identified or are anticipated, and no mitigation measures are required.

Mitigation Measures: None.

Monitoring: None.

[33] Countywide Plan 2020, Accessed May 8, 2026 from General Plan – Land Use Services

XVI. RECREATION

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

SUBSTANTIATION:

a-b) **Less than Significant Impact** - The proposed Project would develop 32 single-family residential lots in the community of Joshua Tree. Based on the average household size for San Bernardino County, the Project would result in a modest increase in population. Residents of the Project would have access to existing recreational facilities in the area, including community parks, recreational programs, and the extensive outdoor resources available in Joshua Tree National Park. The Project site is near these facilities, and the anticipated population increase would not generate demand substantial enough to require the construction of new recreational facilities or the expansion of existing ones. Additionally, the proposed development is not expected to result in the physical deterioration of existing facilities, as the capacity of local parks and recreational resources is sufficient to accommodate the incremental increase in use. Therefore, the Project would not result in the need for new or physically altered recreational facilities, nor cause significant environmental impacts related to recreation. Less than Significant Impact is anticipated.

Mitigation Measures: None.

Monitoring: None.

XVII. TRANSPORTATION

Would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Would the Project conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact** – The Project's impact on the existing circulation system is anticipated to be minimal. To improve roadway capacity and connectivity, the proposed development includes widening East Broadway and Laferney Avenue, paving the existing segment of Sunever Road, and extending Sapphire Road. Internally, the Project would generate approximately 64 additional vehicles associated with the 32 single-family residences, each of which would include a two-car garage. To accommodate this increase in traffic and ensure efficient internal circulation, three new 32-foot-wide streets would be constructed in accordance with County roadway design standards.

The surrounding area consists primarily of vacant rural land with scattered residential development, resulting in low existing traffic volumes on the adjacent roadway system. Given the Project's modest size of 32 single-family lots, the incremental increase in vehicle trips would be readily absorbed by the existing roadway capacity without causing congestion or operational deficiencies. Furthermore, the local circulation network provides multiple access points, and the proposed improvements— including roadway widening, paving, and extensions—would enhance, rather than disrupt, connectivity in the area. As such, the Project would not interrupt or impede transportation circulation in the community. Less than significant impact is anticipated.

Existing Roadway System: Regional access to the Project site is provided by 29 Palms Highway (Highway 62) located approximately 2 miles south of the Project site with Interstate 10, approximately 25 miles to the southwest. Key roadways providing local circulation include Laferney Avenue, Sunever Road and Broadway Street.

Bicycle and Pedestrian Facilities: There are no existing or planned sidewalks in the vicinity of the Project site and they are not required to be installed with Project implementation of street improvements. There is one planned bicycle path in the Project vicinity, along Highway

62 between Park Blvd and Lee Drive according to the SBCTA Non-Motorized Transportation Plan 2018[34]. The Project is located approximately 2 miles north of the planned bike path and is not expected to conflict with the SBCTA program or other plan, ordinance, or policy addressing the circulation system, including bicycle and pedestrian facilities. The Project is not within the Countywide Plan established Mobility Focus Area based on the Transportation & Mobility Element Map TM-3 *Mobility Focus Areas*.[35] Therefore, no conflict with a program plan, ordinance, or policy addressing the circulation system, including bicycle and pedestrian facilities are anticipated.

Transit Service: The Project site is within the service area of Morongo Basin Transit Authority (MBTA), a public transit agency serving various Morongo Valley jurisdictions within San Bernardino County, with bus service along 29 Palms Highway (Highway 62). Bus Route 1 serves Yucca Valley, Joshua tree and Twentynine Palms and Montclair via Highway 62.[36] The nearest bus stop is located on Highway 62 at White Feather Road, 2 miles south of the Project site.

The Proposed Project would be consistent with the following Goals and policies of the Transportation and Mobility Element of the Countywide Plan.

Goal TM-1 Roadway Capacity

Unincorporated areas served by roads with capacity that is adequate for residents, businesses, tourists, and emergency services

Policy TM-1.7 Fair share contributions

We require new development to pay its fair share contribution toward off-site transportation improvements.

Goal TM-4 Complete Streets, Transit, and Active Transportation

On- and off-street improvements that provide functional alternatives to private car usage and promote active transportation in mobility focus areas.

Policy TM-4.4 Transit access for residents in unincorporated areas

We support and work with local transit agencies to generate a public transportation system, with fixed routes and on-demand service, that provides residents of unincorporated areas with access to jobs, public services, shopping, and entertainment throughout the county.

Less than Significant impacts are identified or anticipated, and no mitigation measures are required.

b) **Less than Significant Impact**- Senate Bill (SB) 743 required amendments to the CEQA Guidelines to provide an alternative to Level of Service (LOS) for evaluating transportation impacts. Particularly within areas served by transit, the alternative criteria must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses" (Public Resources Code Section 21099(b)(1)). The CEQA Guidelines now require lead agencies to evaluate transportation impacts based on Vehicle Miles Traveled (VMT), VMT per capita, automobile trip generation rates, or automobile

[34] Non - Motorized Transportation Plan (2018) - SBCTA
[35] TM-3 & ED-1 Focus Areas
[36] Morongo Basin Transit Authority. Interactive Map – Basin Transit. Accessed 4.21.26

trips generated, rather than LOS. This requirement went into effect statewide on July 1, 2020, through CEQA Guidelines section 15064.3.

Consistent with the San Bernardino County Transportation Impact Study Guidelines, the Project was evaluated using the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool. The tool, consistent with the Governor's Office of Planning and Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA*, allows Project locations to be tested against one or more of the County's three screening thresholds: (1) Transit Priority Area (TPA) Screening, (2) Low VMT Area Screening, and (3) Project Type Screening. Projects meeting at least one threshold are presumed to result in a less-than-significant transportation impact without the need for further analysis. The proposed Project is located within a low VMT-generating area and is consistent with the existing land use of the area. Therefore, the Project may be presumed to have a less than significant impact and may screen from VMT analysis according to the Vehicle Miles Travelled (VMT) Screening prepared by TJW Engineering, Inc. July 31, 2026 (Appendix F).

c) **Less than Significant Impact** – The Proposed Project includes the request for approval of a Tentative Tract Map to subdivide an approximately 80-acre site into 32 2.5-acre parcels for single family residential development. Three proposed roads running north to south, parallel to Sunever Road to the east and Laferney Avenue to the west would provide access to the proposed residences. Each of these roads would be constructed to county design standards and would be designed to have 50 foot right of ways with a 32-foot driving surface. The Proposed Project design features would be reviewed and approved during the County's Site Plan review process, County Fire, as well as DPW Traffic and Land Development to ensure that the Project would not impede emergency access to the site and throughout the surrounding residential area, and all design standards such as road widths, curb and gutter requirements are complied with. The Project does not include a geometric design feature or incompatible uses that would substantially increase hazards. Therefore, less significant impacts are identified or anticipated, and no mitigation measures are required.

d) **Less than Significant Impact** - The Proposed Project does not include any use or activity that would interfere with long-term emergency response or evacuation plans in the area. As noted above, Project operation would not alter existing roadways or impede areas designated for emergency access. Prior to construction, the Fire Department and Sheriff's Department would review the Project site plan to ensure that safety measures, including adequate emergency access, are incorporated.

During construction, temporary lane closures may occur, which could affect access for emergency vehicles. However, preparation and implementation of a County-approved traffic control plan would ensure that emergency access is always maintained, reducing potential impacts to less-than-significant levels. Less than significant impacts are expected, and no mitigation measures are required.

Mitigation Measures: None.

Monitoring: None.

XVIII. TRIBAL CULTURAL RESOURCES

Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1 (k) or	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision © of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision © of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe?	☐	☒	☐	☐

a-b) **Less than Significant with Mitigation Incorporated** – The subject property lies within the traditional territory of the Serrano people. While the Mojave Desert is thought to have limited prehistoric subsistence resources, it has supported long-term and occasionally dense populations. Archaeological evidence across the desert includes villages, camps, burials, quarries, rock features, and bedrock mortars, with some sites spanning long prehistoric periods. Early remains are rare and typically found along former pluvial lake margins or dune deflation areas, while artifacts on the desert floor tend to be sparse and scattered. The region's cultural chronology is generally agreed upon by archaeologists and includes the Paleo Indian, Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Ethnohistoric periods. The results of the Cultural Resources Survey update for the Project are consistent with the 2023 BFSA findings (Appendix C and Appendix C-1). The two previously recorded historic trash scatters (sites Temp-1 and Temp-2) within the subject property are not significant and ineligible for listing on the CRHR. No previously unidentified resources were identified during the survey.

As stated in Section 4.0 Consultation with Native American Tribes, Table 4.0-1, YSMN does not have any concerns with the Project's implementation, as planned, at this time. However, due to the potential for the Project to impact a resource of tribal cultural significance, YSMN and MBMI provided Cultural Mitigation recommendations which have been incorporated into section V. Cultural Resources as well as the following Tribal Cultural Resources below. More specifically, Mitigation measures **TCR-1** through **TCR-10**, and **CUL-4** would be implemented to reduce impacts to potential tribal cultural and archaeological resources during ground disturbing activities tied to the future residential development of the property. However, during grading, the consulting archaeologist shall have the authority to modify and reduce the monitoring program to either periodic spot-checks or suspension of the monitoring

program if the potential for cultural resources appears to be less than anticipated. Therefore, with implementation of Mitigation Measures **TCR-1** through **TCR-10** and **CUL-4**, impacts to tribal cultural resources that are significant pursuant to criteria set forth in subdivision © of Public Resources Code Section 5024, would be reduced to less than significant levels.

Mitigation Measures

Yuhaaviatam of San Manuel Nation (YSMN)

TCR-1: The Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN) shall be contacted, as detailed in CUL-1, of any pre-contact cultural resources discovered during Project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with YSMN, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a monitor to be present that represents YSMN for the remainder of the Project, should YSMN elect to place a monitor on-site.

TCR-2: Any and all archaeological/cultural documents created as a part of the Project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant shall, in good faith, consult with YSMN throughout the life of the Project.

Morongo Band of Mission Indians (MBMI)

TCR-3: Native American Treatment Agreement. Prior to the issuance of grading permits, the applicant shall enter into a Tribal Monitoring Agreement with the Morongo Band of Mission Indians for the project. The Tribal Monitor(s) shall be on-site during all ground-disturbing activities (including, but not limited to, clearing, grubbing, tree and bush removal, grading, trenching, fence post placement and removal, construction excavation, excavation for all utility and irrigation lines, and landscaping phases of any kind). The Tribal Monitor(s) shall have the authority to temporarily divert, redirect, or halt the ground-disturbing activities to allow identification, evaluation, and potential recovery of cultural resources and/or tribal cultural resources.

TCR-4: Retention of Archaeologist. Prior to any ground-disturbing activities (including, but not limited to, clearing, grubbing, tree and bush removal, grading, trenching, fence post replacement and removal, construction excavation, excavation for all utility and irrigation lines, and landscaping phases of any kind), and prior to the issuance of grading permits, the Applicant shall retain a qualified archaeologist who meets the U.S. Secretary of the Interior Standards (SOI). The archaeologist shall be present during all ground-disturbing activities to identify any known or suspected archaeological and/or cultural resources. The archaeologist will conduct a Cultural Resource Sensitivity Training, in conjunction with the Tribe[s] Tribal Historic Preservation Officer (THPO), and/or designated Tribal Representative. The training session will focus on the archaeological and tribal cultural resources that may be encountered during ground-disturbing activities as well as the procedures to be followed in such an event.

TCR-5: Cultural Resource Management Plan. Prior to any ground-disturbing activities the project archaeologist shall develop a Cultural Resource Management Plan (CRMP)

and/or Archaeological Monitoring and Treatment Plan (AMTP) to address the details, timing, and responsibilities of all archaeological and cultural resource activities that occur on the project site. This Plan shall be written in consultation with the Consulting Tribe[s] and at minimum, shall include the following: (1) the approved Mitigation Measures (MM)/Conditions of Approval (COA), (2) procedures for each MM/COA, (3) the contact information for all pertinent parties, (4) parties' responsibilities, and (5) an overview of the project schedule.

TCR-6: Pre-Grade Meeting. The retained qualified archeologist and Consulting Tribe[s] representative shall attend the pre-grade meeting with the grading contractors to explain and coordinate the requirements of the monitoring plan.

TCR-7: On-site Monitoring. During all ground-disturbing activities the qualified archaeologist and the Tribal Monitor(s) shall be on-site full-time. The frequency of inspections shall depend on the rate of excavation, the materials excavated, and any discoveries of Tribal Cultural Resources as defined in California Public Resources Code Section 21074. Archaeological and Native American monitoring will be discontinued when the depth of grading and the soil conditions no longer retain the potential to contain cultural deposits. The qualified archaeologist, in consultation with the Tribal Monitor(s), shall be responsible for determining the duration and frequency of monitoring.

TCR-8: Inadvertent Discovery of Cultural Resources. In the event that previously unidentified cultural resources are discovered /unearthed during construction, the qualified archaeologist and the Tribal Monitor(s) shall have the authority to temporarily divert and/or temporarily halt ground-disturbance activities in the area of discovery to allow for the evaluation of potentially significant cultural resources. Isolates and clearly non-significant deposits shall be minimally documented in the field and collected so the monitored ground-disturbing activity can proceed.

If a potentially significant cultural resource(s) is discovered, work shall stop within a 60-foot perimeter of the discovery and an Environmentally Sensitive Area (ESA) physical demarcation/barrier constructed. All work shall be diverted away from the vicinity of the find(s), so that it/they can be evaluated by the qualified archaeologist and Tribal Monitor[s]. The archaeologist shall notify the Lead Agency and Consulting Tribe[s] of said discovery. The qualified archaeologist, in consultation with the Lead Agency, the Consulting Tribe[s], and the Tribal monitor, shall determine the significance of the discovered resource. A recommendation for the treatment and disposition of the Tribal Cultural Resource shall be made by the qualified archaeologist in consultation with the Tribe[s] and the Tribal monitor[s] and be submitted to the Lead Agency for review and approval.

Below are the possible treatments and dispositions of significant cultural resources in order of CEQA preference:

A. Full avoidance.
B. If avoidance is not feasible, Preservation in place.

If Preservation in place is not feasible, all items shall be reburied in an area away from any future impacts and reside in a permanent conservation easement or Deed Restriction.

C. If all other options are proven to be infeasible, data recovery through excavation

and then curation in a Curation Facility that meets the Federal Curation Standards (36 CFR 79).

Unless otherwise agreed upon by all parties, all removed items from the Project shall be temporarily curated on-site in a secure and locked location (i.e., Conex box, a lockable office or drawer with restricted access to it, etc.). A periodic inventory must be maintained and provided to Consulting Tribe[s].

TCR-9: Inadvertent Discovery of Human Remains. The Morongo Band of Mission Indians requests the following specific conditions to be imposed in order to protect Native American human remains and/or cremations. ***No photographs are to be taken except by the coroner, with written approval by the Consulting Tribe[s].***

A. Should human remains and/or cremations be encountered on the surface or during any and all ground-disturbing activities (i.e., clearing, grubbing, tree and bush removal, grading, trenching, fence post placement and removal, construction excavation, excavation for all water supply, electrical, and irrigation lines, and landscaping phases of any kind), work in the immediate vicinity of the discovery shall immediately stop within a 100-foot perimeter of the discovery. The area shall be protected by the establishment of an ESA with a marked boundary. Project personnel/observers will be restricted from entry into the ESA. The County Coroner is to be contacted within 24 hours of discovery. The County Coroner has 48 hours to make his/her determination pursuant to State and Safety Code §7050.5. and Public Resources Code (PRC) § 5097.98.

B. In the event that the human remains and/or cremations are identified as Native American, the Coroner shall notify the Native American Heritage Commission (NAHC) within 24 hours of determination pursuant to subdivision © of HSC §7050.5.

C. The NAHC shall immediately notify the person or persons it believes to be the Most Likely Descendant (MLD). The MLD has 48 hours, upon being granted access to the Project site, to inspect the site of discovery and make his/her recommendation for final treatment and disposition, with appropriate dignity, of the remains and all associated grave goods pursuant to PRC §5097.98.

D. If the Morongo Band of Mission Indians has been named the MLD or Co-MLD, the Tribe may wish to rebury the human remains and/or cremation and sacred items in their place of discovery with no further disturbance where they will reside in perpetuity. The place(s) of reburial will not be disclosed by any party and is exempt from the California Public Records Act (California Government Code § 6254[r]). Reburial location of human remains and/or creations will be determined by the Tribe's MLD, the landowner, and the City Planning Department.

TCR-10: FINAL REPORT. The final report[s] created as a part of the project (CRMP/AMTP, isolate records, site records, survey reports, testing reports, etc.) shall be submitted to the Lead Agency and Consulting Tribe[s] for review and comment. After approval of all parties, the final reports are to be submitted to the appropriate Information Center (IC), and the Consulting Tribe[s].

XIX. UTILITIES AND SERVICE SYSTEMS

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's Projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with Federal, State, and local management and reduction statues and regulations related to solid waste?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact** – The Proposed Project would not require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities.

The Proposed Project would be required to connect into the existing utilities such as electricity, natural gas, water, wastewater, telecommunications, etc. These services already exist in the general area. Connections would occur on the project site or within existing roadways or right-of-way. Connections to these utilities are assumed as part of the proposed project and impacts to environmental resources have been discussed throughout the document.

Southern California Edison for Electricity

The Project proposes the subdivision of a parcel into 32 lots that would allow for the development of 32 single-family residences. In 2024, the residential sector of the Southern

California Edison planning area consumed 27,131 GWh of electricity for residential use[37]. The proposed 32-lot subdivision would result in the construction of 32 new single-family homes and would not result in a significant increase in electrical demand with the typical single family home estimated electricity demand at approximately 0.011 GWh per home/per year.[38] The CalEEMod data projected that the residential uses would consume approximately 243,508 kWh/year for operational related activities for the 32 units which is approximately 0.2435 GWh, an inconsequential increase in electricity demand. This demand would be met by extension of SCE services as master planned from Sunfair along Broadway to the Project Site; no impact would result from construction within the road rights-of-way. As such, overall impacts would be less than significant.

Southern California Gas Company for Natural Gas

The Project site is located within the service area of Southern California Gas (SoCal Gas). The Proposed Project's estimated annual natural gas demand is 12,812.76 therms. The Proposed Project would create a permanent increase demand for natural gas. According to the California Energy Commission, the natural gas consumption of the SoCalGas residential sector was 2,150 MM therms (millions of therms) in 2024.[39] The Proposed Project's estimated annual natural gas consumption, using the output from CalEEMod, compared to the 2024 annual natural gas consumption of the overall residential sector in the SoCal Gas Planning Area would account for approximately 0.00005632 percent of the total natural gas consumption. This demand would be met by extension of SoCal Gas services as master planned from Sunfair along Broadway to the Project Site; no significant impacts to the environment would occur from construction within the road rights-of-way. Therefore, projected natural gas demand would result in a less than significant impact to SoCal Gas level of service.

Joshua Basin Water District for Water

The Applicant has been in communication with Joshua Basin Water District and JBWD has stated there is a water main installed and ready to serve the Project Site upon payment of fees and completion of District application requirements, one of which is approval of the project's tentative map (see Appendix G). The District does not provide will serve letters for development in the planning stages, only the water availability letter that has already been provided to the Applicant. Upon receipt of an application for water service following project approval, JBWD would make a final determination as to the requirements to meet the water demands of the subdivision. Based on JBWD's water availability letter, it is anticipated that JBWD will require on-site infrastructure design, the environmental impacts of which have been analyzed as part of this MND. No relocation or construction of new or expanded infrastructure is anticipated. The County's standard conditions of approval will require a will serve letter from JBWD to be obtained by the applicant prior to the issuance of building permits.

[37] California Energy Commission 2024. California Electricity Consumption Dashboard, Data last updated Data last updated January 27, 2026, accessed May 7, 2026 from Electricity Consumption.

[38] U.S. Energy Information Administration, accessed May 8, 2026, Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA)

[39] California Energy Commission 2024. California Natural Gas Consumption Dashboard, Data last updated January 27, 2026, Accessed May 7, 2026 from Natural Gas Consumption

Environmental Health Division approved onsite water treatment system (OWTS)

Adequate Service Certification-Onsite Sewage Disposal (Form S2, has been provided and signed by Project applicant as well as Environmental Health Services 8/7/2025 (see Appendix G).

AT&T for Telephone Service

Frontier Communications for Internet

Commitment to serve letter received July 22, 2025 and can be found in Appendix G.

All wet and dry utilities can be accommodated within the proposed rights of way of the three new roads. With service commitments, via will serve letters for service where appropriate, less than significant impacts to utilities and public services is expected to be less than significant.

b) **Less than Significant Impact** - As stated above, the Project would be served by Joshua Basin Water District (JBWD), which has confirmed adequate water supply to meet current demands and reasonably foreseeable future development, including the proposed 32-lot residential Project (see Appendix G).

The JBWD is the public water utility that would provide water service to the Project site. JBWD supplies water to the community from two groundwater basins. The USGS estimated natural recharge from rainfall to be approximately 123 AFY per year on average with an additional 84 AFY entering the subbasins as underflow from the adjacent Warren Basin, representing a total of 207 AFY in natural recharge to the Joshua Tree and Copper Mountain subbasins. USGS also estimated that on average about 200 AFY leaves the Joshua Tree and Copper Mountain subbasins by underflow to the Surprise Spring subbasin. Due to similar estimates of water entering and leaving the subbasins as a result of natural recharge and underflow, it has been assumed that no water from natural groundwater recharge is available for the purposes of the UWMP. Beginning in 2014, JBWD began receiving State Water Project (SWP) water from Mojave Water Agency, averaging 500 AF per year for the past two years.[40]

Overdrafting a groundwater basin is ultimately unsustainable, although given a large volume of water in storage and a relatively small overdraft, it can continue for a considerable time. Limited or short-term overdraft is not considered a significant negative impact; however, excessive overdraft can result in significant problems, such as a decrease in the amount of groundwater in storage, or a decline in water levels that induce the migration of poor-quality water into productive areas of an aquifer. In order to reduce overdraft to groundwater supplies, JBWD entered into the Improvement District Morongo Agreement with Mojave Water Agency (MWA) to provide recharge water to the Joshua Tree subbasin. Improvement District “M” (IDM) was formed in 1988 to provide the means to construct the Morongo Basin Pipeline Project. The final bonds were issued in 1992, and the terms were 30 years. MWA adopted Ordinance 9 in 1995 which established the rules and regulations for the sale and delivery of State Project Water (SWP) to its customers. Now that the IDM debt has been repaid, MWA’s customers are now following these rules. Water sales and deliveries under Ordinance 9 are considered temporary interruptible.

[40] Kennedy/Jenks Consultants. Final 2020 Urban Water Management Plan for Joshua Basin Water District. Section 4 Water Resources, September 2022

According to the 2016 American Community Survey (ACS), the average persons per household was 3.41 countywide and 3.23 when limited to unincorporated areas.[41] The Joshua Basin Water District 2020 Urban Water Management Plan (September 2022), Section 3: Table 3-2 lists the actual gallons per capita per day water use of 125 gallons in 2015 with a target of 116 by 2020.[42]. Therefore, the Proposed Project's residential units would have an estimated water demand of approximately 11,989 gallons per day or 13.43 acre-feet per year. The Urban Water Management Plan for Joshua Basin Water District is based on Project growth included in General Plans. The Proposed Project is consistent with the land use and population projections included in the Countywide Policy Plan. The UWMP determined that the JBWD has adequate supplies to meet demands during average, single-dry, and multiple-dry years throughout the 25-year planning period (2015 to 2040).[43] While during dry years, the groundwater basin would continue to be overdrafted to meet the supplies due to the lack of imported supplies being available to recharge the basin, the planned imported SWP supply would lessen and offset the overdraft as much as possible.

Mojave Water Agency (MWA) initiated the Mojave Water Agency Population Forecast completed in December 2015 by Beacon Economics. The population forecast utilized historical population trends to drive future results. Historical populations were derived from the California Department of Finance, which provides population estimates from 1970 forward on an annual basis. With this data available, econometric models were produced to capture historical correlations within countywide population growth.

As stated previously, population growth from the Proposed Project is already anticipated from buildout of the Countywide Policy Plan Planning Area. Therefore, water demand from the Proposed Project has already been anticipated by JBWD. Less than significant impacts are expected, and no mitigation measures are required.

c) **Less than Significant Impact** – According to the Percolation Report (Appendix E-2) OWTS are planned for the development. Based on data presented in the report there appears to be sufficient area on each proposed parcel for a proposed OWTS. Review and approval of the OWTS would be coordinated with the San Bernardino County Department of Environmental Health. Adequate Service Certification Form 2 has been provided and can be found in Appendix G. Less than significant impact is expected.

d) **Less than Significant Impact** - CalRecycle provides estimates for solid waste generation created by residences over a certain amount of time. The Proposed Project includes 32 residential lots. According to CalRecycle's estimated solid waste generation rates for single-family residences, the Proposed Project would generate at most, approximately 320 pounds of solid waste per day or approximately 0.32 tons per day, based on 10 pounds per unit per day.[44] The Project site is located in the East Desert Region of the County, which is served by the Landers Sanitary Landfill owned and operated by San Bernardino County. As of 2016, the existing remaining permitted capacity at the landfill was 11,148,100 tons. The Landers Sanitary Landfill has a maximum daily disposal capacity of 1,200 tons/day. The

[41] San Bernardino Countywide Policy Plan Draft EIR. Population and Housing. Table 5.13-5 "Adopted SCAG 2040 Growth Forecasts."
[42] Kennedy/Jenks Consultants. Final 2020 Urban Water Management Plan for Joshua Basin Water District. page 3-3 September 2022,
[43] Kennedy/Jenks Consultants. Final 2020 Urban Water Management Plan for Joshua Basin Water District. September 2022
[44]

Proposed Project would account for approximately 0.024 percent of the maximum daily disposal capacity.

Waste generated from the Proposed Project would therefore not be expected to significantly impact the solid waste system. Therefore, less than significant impacts are expected, and no mitigation measures are required.

e) **Less than Significant Impact -** San Bernardino County, Department of Public Works, Solid Waste Management Division reviews and approves all new construction projects which are required to submit a Construction and Demolition Solid Waste Management Plan. The mandatory requirement to prepare a Construction and Demolition Solid Waste Management Plan would ensure that impacts related to construction waste would be less than significant. A project's waste management plan is to consist of two parts which are incorporated into the Conditions of Approval (COA's) by the San Bernardino County Planning and Building & Safety divisions. As part of the plan, projects are required to estimate the amount of tonnage to be disposed and diverted during construction. Additionally, projects must provide the amount of waste that would be diverted and disposed of. Disposal/diversion receipts or certifications are required as a part of that summary.

Future residents would be required to coordinate with a waste hauler to collect solid waste on a common schedule as established in applicable local, regional, and State programs. The Proposed Project shall adhere to the California Integrated Waste Management Act of 1989 (AB 939), AB 1327, Chapter 18 (California Solid Waste Reuse and Recycling Access Act of 1991), and any other applicable local, State, and federal solid waste management regulations.

The Proposed Project would comply with all federal, State, and local statutes and regulations related to solid waste. Solid waste produced during the construction phase or operational phase of the Proposed Project would be disposed of in accordance with all applicable statutes and regulations. Therefore, less than significant impacts are expected, and no mitigation measures are required.

Mitigation Measures: None required.

Monitoring: None required.

XX. WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project:

Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to, pollutant concentrations from wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water resources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, because of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant Impact** - The Project site is not located within a Very High Fire Hazard Severity Zone (VHFHSZ) or in a State Responsibility Area (SRA). The Project site is currently undeveloped with native vegetation throughout the site and is located within a moderate Fire Hazard Severity Zone (FHSZ)[45] The proposed Project parcels would be accessible via three internal north-south oriented roads that are parallel with Laferney Avenue to the west and Sunever Road to the east and bound by Broadway Street to the north. According to San Bernardino County Policy Plan Evacuation Routes Map PP-2, the roads surrounding the site are not evacuation routes. The nearest evacuation route is Highway 62, approximately 2.0 miles south of the Project site.[46] The contractor would be required to maintain adequate emergency access for emergency vehicles as required by the fire and police authorities during temporary construction. The proposed Project would not impair an adopted emergency response plan or emergency evacuation plan. Therefore, less than significant impacts are anticipated, and no mitigation measures are required

b) **Less than Significant Impact** –and within a Local Responsibility Area (LRA)[47] meaning that local fire protection agency would be San Bernardino County Fire. The proposed Project shall comply with all applicable statues, codes, ordinances, and standards of the San Bernardino County Fire Department. Therefore, given the minimal potential for wildfire within the Project

[45] San Bernardino County. County Policy Plan Hazards Element maps: HZ-5 “Fire Hazard Severity Areas” and HZ-6 “Fire Responsibility Areas”. Accessed 4.22.26
[46] San-Bernardino-County-Countywide-Plan-Policy-Plan-PP-2-Evacuation-Routes.pdf
[47] CalFire, Fire Hazard Severity Zones. Fire Hazard Severity Zones | OSFM. Accessed 4.22.26

site, there is a less than significant impact for the proposed Project to expose occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire. Impacts under this issue are considered less than significant. No mitigation measures are required.

c) **Less than Significant Impact** - The Proposed Project would include utilities and infrastructure; the installation, operation and maintenance of which would be in compliance with fire safety regulations that require utility inspections. The proposed improvements would also be made in accordance with development standards for residential development per the San Bernardino County Development Code Table 82-9A Residential Land Use Zoning District Development Standards.[48]. Additionally, new construction is subject to the latest standards of the California Fire Code. Less than significant impacts are identified or anticipated, and no mitigation measures are required. No aspects of the Proposed Project would exacerbate fire risks that could result in temporary or ongoing impacts to the environment.

d) **Less than Significant Impact** - Topography of the Project site is relatively level. Additionally, the Project site is not located within a 100-year FEMA Flood Zone Area and there are no dams, reservoirs, or large water bodies near the Project Site, as shown on FEMA FIRM Map Panel 06071C8145J, the Project site lies within the Zone X designation. These are areas determined to be outside of the 0.2% annual chance floodplain. The Project site is not anticipated to expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. Less than significant adverse impacts are identified or anticipated, and no mitigation measures are required.

Mitigation Measures: None.

Monitoring: None.

[48] San Bernardino County Development Code Title 8. Accessed 4.22.26 from https://codelibrary.amlegal.com/codes/sanbernardino/latest/overview.

7.0 MANDATORY FINDINGS OF SIGNIFICANCE

Would the Project:				
Issues	*Potentially Significant Impact*	*Less than Significant With Mitigation Incorporated*	*Less Than Significant*	*No Impact*
a) Does the Project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects)?	☐	☐	☐	☒
c) Does the Project have environmental effects, which would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

SUBSTANTIATION:

a) **Less than Significant with Mitigation Incorporated** - The Project site consists entirely of vacant land with creosote bush scrub habitat and some disturbed areas with sparse nonnative vegetation. The site is bordered by residential development to the west and vacant land to the north, east and south. The Project site is in an area of Joshua Tree with low-density residential and rural land use. The site contains three Western Joshua Trees which are critical habitat for any listed or sensitive wildlife species. The Project's design and construction would avoid sensitive natural and cultural resources with mitigation measures in coordination with CDFW California Department of Fish and Wildlife. Adherence to County environmental and cultural resource requirements would ensure that any potential impacts are avoided or minimized. With implementation of mitigation measures **BIO-1** through **BIO-5** in section IV-Biological Resources, the Project would not substantially degrade the environment, reduce wildlife or plant populations, or disturb important historical or prehistoric resources. Although cultural resources were not observed on the Project site, it is recommended to implement **CUL-1** through **CUL-4,** discussed in section V. Cultural Resources and **TCR-1** through **TCR-10** in section XVIII-Tribal Cultural Resources in the event there are inadvertent discoveries made. Impact is Less than Significant with Mitigation Incorporated.

b) **No Impact** - Cumulative impacts are defined as two or more individual effects that, when considered together, are considerable or that compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment that

results from the incremental impact of the development when added to the impacts of other closely related past, present, and reasonably foreseeable or probable future developments. Cumulative impacts can result from individually minor but collectively significant developments taking place over a period. The CEQA Guidelines, Section 15130 (a) and (b), states:

- Cumulative impacts shall be discussed when the Project's incremental effect is cumulatively considerable.
- The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided of the effects attributable to the Project. The discussion should be guided by the standards of practicality and reasonableness.

The Proposed Project is surrounded by vacant land to the north, south, and east, with scattered single-family residences to the west. The Proposed Project would increase residential housing in the County. The construction of such housing would not subject residents to any adverse long-term environmental effects caused by its implementation. Based on the Project's objectives and the lack of any significant adverse environmental impacts, this Project is in compliance with the San Bernardino County Countywide Plan. Impacts associated with the Proposed Project would not be considered individually adverse or unfavorable and is a conditionally acceptable use No cumulative impacts are identified or anticipated, and no mitigation measures are required.

The proposed 32-lot residential Project is small in scale and located in a low-density, rural portion of Joshua Tree. The incremental environmental effects of the Project such as traffic, water demand, and solid waste generation are minimal and would not combine with other past, present, or reasonably foreseeable future projects to create significant cumulative impacts. Standard compliance with County regulations and environmental protection measures would ensure that the Project's contributions to cumulative effects remain negligible. Therefore, the Project's impacts are not cumulatively considerable. No Impacts are expected.

c) **Less than Significant Impact** – The Project construction and operation would comply with applicable County, State, and federal regulations governing air quality, noise, traffic, water supply, and hazardous materials. Mitigation measures and standard regulatory requirements would further ensure that any potential impacts are minimized. As a result, the Project would not cause substantial adverse effects on human beings, either directly or indirectly. Impact would be less than significant.

All potential impacts have been thoroughly evaluated and have been deemed to be neither individually significant nor cumulatively considerable in terms of any adverse effects upon the region, the local community or its inhabitants. At a minimum, the Project would be required to meet the conditions of approval for the Project to be implemented. It is anticipated that all such conditions of approval would further ensure that no potential for adverse impacts would be introduced by construction activities, initial or future land uses authorized by the Project approval.

The incorporation of design measures, San Bernardino County policies, standards, and guidelines and proposed mitigation measures as identified within this Initial Study would ensure that the Proposed Project would have no significant adverse effects on human beings, either directly or indirectly on an individual or cumulative basis.

8.0 REFERENCES

California Air Resources Board. California Greenhouse Gas Emission Inventory – 2024 Edition. Accessed on 4/17/26 from Current California GHG Emission Inventory Data | California Air Resources Board

CalFire, Fire Hazard Severity Zones. Accessed May 8, 2026 from Fire Hazard Severity Zones | OSFM.

California Department of Conservation Open Data and Maps. Accessed May 8, 2026 from California Department of Conservation: Open Data and Map Access

California Department of Conservation Farmland Mapping and Monitoring Program Accessed May 8, 2026 from Farmland Mapping & Monitoring Program

California Department of Fish and Wildlife. August 2023. California Natural Community Conservation Plans. Accessed on 4/17/26 from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=68626&inline

California Department of Toxic Substances Control. EnviroStor. Accessed on 4/17/26 Your EnviroStor | Department of Toxic Substances Control (ca.gov)

California Department of Transportation. California Scenic Highway Program - GIS layer representing California Eligible and Officially Designated scenic highway routes. Accessed on 2/14/25 from https://www.arcgis.com/home/item.html?id=f0259b1ad0fe4093a5604c9b838a486a

California Energy Commission 2024. California Electricity Consumption Dashboard, Data last updated Data last updated January 27, 2026, Accessed May 7, 2026 from Electricity Consumption.

California Energy Commission 2024. California Natural Gas Consumption Dashboard, Data last updated January 27, 2026, Accessed May 7, 2026 from Natural Gas Consumption

California Energy Commission Efficiency Division. Title 24: 2025 Building Energy Efficiency Standards. Accessed on 4/17/26 from 2025 Building Energy Efficiency Standards

California Natural Diversity Database, Accessed 2/14/25 from California Natural Diversity Database

California State Water Resources Control Board, Accessed on 4/17/26 from State Water Board Programs | California State Water Resources Control Board

California Williamson Act Enrollment Finder, Map Viewer, Accessed May 8, 2026 from California Williamson Act Enrollment Finder

Mojave Desert Air Quality District, CEQA and Federal Conformity Guidelines February 2020, Accessed on May 8, 2026 from About Rule & Plan Development | Mojave Desert Air Quality Management District

Morongo Basin Transit Authority. Accessed April 21, 2026 from Interactive Map – Basin Transit.

Morongo Unified School District (MUSD), Enrollment | Morongo Unified School District. Accessed 4.21.26

United States Geological Survey, USGS Interactive Fault Map USGS Quaternary Fault Application Accessed May 6, 2026

U.S. Energy Information Administration, Accessed May 8, 2026, Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA)

United States Department of Transportation, Federal Highway Administration. Motor Fuel Use – 2017. Accessed on 4/17/26 from https://www.fhwa.dot.gov/policyinformation/statistics/2016/mf21.cfm

8.1. PROJECT SPECIFIC REFERENCES

CalEEMod Runs, Joshua Tree Estates Project. March 11, 2026, PGN.

Cultural Resources Survey Update for the Joshua Tree Estates Project. Community of Joshua Tree. County of San Bernardino. 06/12/2025, BFSA Environmental Services, a Perennial Company.

Cultural Resources Survey Update for the Joshua Tree Estates Project – Confidential Appendix. Community of Joshua Tree. County of San Bernardino. 06/12/2025, BFSA Environmental Services, a Perennial Company.

Final Drainage Study Tentative Tract Map 20668. County of San Bernardino. 03/12/2026. Adkan Engineers.

General Biological Assessment for APN 0605-051-01. County of San Bernardino. 08/04/2025, BFSA Environmental Services, a Perennial Company. Juan J. Hernandez., Hernandez Environmental Services

Greenhouse Gas Emissions Screening Table. County of San Bernardino. 08/12/2025. Completed by: JT Santorini Villa LLC

Geotechnical Investigation, January 5, 2023, Sladden Engineering

Geotechnical & Sewage Disposal Feasibility Report. Community of Joshua Tree. County of San Bernardino. 05/06/2025, Sladden Engineering.

Noise Impact Study for Joshua Tree Estates-TTM 20668, 12/2/2025, MD Acoustics

Paleontological Assessment for the Joshua Tree Estates Project Update Letter. Community of Joshua Tree. County of San Bernardino. 07/17/2025, BFSA Environmental Services, a Perennial Company.

Percolation Testing for Onsite Sewage Disposal Feasibility. Community of Joshua Tree. County of San Bernardino. 01/10/2023. Sladden Engineering.

Preliminary Mojave River Watershed Water Quality Management Plan (WQMP), 9/15/2025, Adkan Engineers

County of San Bernardino 2007, amended May 2, 2019 CHAPTER 82.20: PALEONTOLOGIC RESOURCES (PR) OVERLAY. Accessed 4.20.26

San Bernardino Countywide Policy Plan Draft EIR. Hazards and Hazardous Materials. Accessed May 8, 2026 from Ch_05-08-HAZ.pdf

San Bernardino Countywide Plan/Policy Plan 2020 Natural Resources Element Map NR-4 Mineral Resource Zones. Accessed May 6, 2026 from NR-4 Mineral Resource Zones

San Bernardino County Policy Plan Hazards Element maps: HZ-5 “Fire Hazard Severity Areas” and HZ-6 “Fire Responsibility Areas”. Accessed 4.22.26

San Bernardino County Development Code Accessed May 8, 2026 from https://codelibrary.amlegal.com/codes/sanbernardino/latest/overview.

San Bernardino Countywide Plan Hazards Element Map HZ-2 Liquefaction & Landslides, Accessed May 8, 2026 from HZ-2 Liquefaction & Landslides

San Bernardino Countywide Plan Hazards Element Map HZ-1 Earthquake Fault Zones, Accessed May 8, 2026 from HZ-1 Earthquake Fault Zones

San Bernardino Countywide Plan 2020, Housing Element. Accessed 4.20.26 from Housing – San Bernardino County.

San Bernardino Countywide Policy Plan Draft EIR Chapter 5.6 Geology and Soils

San Bernardino Countywide Plan/Policy Plan 2020. Accessed May 8, 2026 from *LU-1 Land Use Map*.

San Bernardino Countywide Plan/Policy Plan 2020. Accessed May 8, 2026 from TM-3 & ED-1 Focus Areas

San Bernardino Countywide Plan Draft PEIR. June 2019, Placeworks, Accessed May 8, 2026 from Document Download – San Bernardino County

San Bernardino Countywide Policy Plan Draft EIR. Population and Housing. Table 5.13-5 "Adopted SCAG 2040 Growth Forecasts." Accessed April 21, 2026

San Bernardino County Development Code CHAPTER 82.20: PALEONTOLOGIC RESOURCES (PR) OVERLAY

San Bernardino County. Development Code. Section 83.01.08 *Noise*. Accessed April 20, 2026

San Bernardino County Greenhouse Gas Reduction Plan, June 2021. Page 5

San Bernardino County Transportation Authority, Accessed May 8, 2026 from Non - Motorized Transportation Plan (2018) - SBCTA

Vehicle Miles Travelled (VMT) Screening July 31, 2026, TJW Engineering, Inc.

PROJ-2023-00129: Joshua Tree Estates Project

Community of Joshua Tree, San Bernardino County, California

APN 0605-051-01

Tentative Tract Map TTM 20668

Planned Development (Residential)

CalEEMod Runs

Prepared for

JT Santorini Villa LLC
1751 Colorado Boulevard #333
Los Angeles, California 90041

Prepared by

PGN
PO Box 2473
Menifee, CA 92586-1473

March 11, 2026

Joshua Tree Estates – PROJ-2023-00129

PROJECT AIR QUALITY IMPACT

INTRODUCTION

The Joshua Tree Estates Project is an application for residential development being processed by the County of San Bernardino under case number PROJ-2023-00129 that includes the subdivision of 81.2 gross acres of land into 32 developed residential lots in the Rural Living (RL) General Plan Land Use designation and the construction and operation of a planned residential development for 32 single-family villas within the Joshua Tree/Rural Living (JT/RL) Zoning District. The Project site is located at the southeast corner of East Broadway and Laferney Avenue and is bounded by Laferney Avenue to the west, East Broadway to the north, Sunever Road to the east, and Sapphire Street to the south. The Project is located in the north one-half of the northeast one-quarter of Section 20, Township 1 North, Range 7 East, and is depicted on the Joshua Tree North U.S. Geological Survey's (USGS) 7.5-minute Topographic Quadrangle map. The Assessor Parcel Number is 0605-051-01.

The proposed subdivision is also identified as Tentative Tract Map 20668 with lot ranges between 2.50 and 2.67 acres and the internal roadways account for approximately 11.0 acres. Each lot proposes the construction of a single-family home with a septic system and individual infiltration trenches for water quality treatment purposes. The Project consists of 32 single-family villas across three models: Plan 1 will be 11 units at 2,265 sq. ft. each for a total of 24,915 sq. ft., Plan 2 will be 11 units at 2,470 sq. ft. each for a total of 27,170 sq. ft., and Plan 3 will be 10 units at 2,532 sq. ft. for a total of 25,320 sq. ft. with approximately 77,405 sq. ft. of residential floor area for the entire Project. Additional improvements include construction of adjacent roadways to their ultimate rights-of-way and new internal 50-foot-wide public roads identified as Arizona, California and Delaware Avenues.

This impact assessment was prepared to evaluate whether the estimated criteria pollutants and GHG emissions generated from the project would cause a significant impact to the air resources in the Project area. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The assessment is consistent with the methodology and emission factors endorsed by Mojave Desert Air Quality Management District (MDAQMD), California Air Resource Board (CARB), and the United States Environmental Protection Agency (US EPA).

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT

The 1976 Lewis Air Quality Management Act established the Mojave Desert Air Quality Management District (MDAQMD) and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the state.

The CARB is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans. California is divided geographically into air basins for the purpose of managing the air resources of the State on a regional basis. An air basin generally has similar meteorological and geographic conditions throughout.

The State is currently divided into 15 air basins. The proposed Project site is located within the Mojave Desert Air Basin (MDAB). The MDAQMD includes the desert portion of the San Bernardino County. The MDAQMD is responsible for controlling emissions primarily from stationary sources within the MDAQMD and also maintains air quality monitoring stations to document historical and current levels of air quality within the District. The MDAQMD is also responsible for developing, updating, and implementing the Ozone Attainment Plan (MDAQMD 2004) which establishes a plan to implement, maintain, and enforce a program of emission control measures to attain and maintain the federal ozone air quality standards. Attainment plans prepared by the various air pollution control districts throughout the state are used to develop the SIP for the State of California. The proposed Project is located within the MDAQMD and, thus, is subject to the rules and regulations of the MDAQMD.

The MDAQMD and SCAG are responsible for formulating and implementing the air quality attainment plan (AQAP) for the Basin. Regional AQAPs were adopted in 1991, 1994, and 1997. The following SIP and AQAP are the currently approved plans for the Basin region:

- 1997 SIP for O_3, PM10, and NO_2
- 1995 Mojave Desert Planning Area Federal PM10 Attainment Plan; no formal action by the EPA

The MDAQMD completed the MDAQMD 2004 Ozone Attainment Plan (State and federal) in April 2004, which has been approved by the EPA.

The MDAQMD is downwind of the Los Angeles basin and the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the MDAB during the summer ozone season. These transport couplings have been officially recognized by the CARB. Local MDAQMD emissions contribute to exceedances of both the NAAQS and CAAQS for ozone, but photochemical ozone modeling conducted by the MDAQMD and CARB indicates that the MDAB would be in attainment of both standards without the influence of this transported air pollution from upwind regions. Therefore, emissions reductions in the upwind area are critical to the attainment demonstration.

The following includes, but is not limited to, the MDAQMD rules that are applicable to the proposed project:

Rule 201 (Permit to Construct) requires written authorization to build, erect, install, alter, or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants. With respect to the proposed project, this rule would apply to any stationary equipment that is not otherwise exempt from this rule as an insignificant source of air pollutants (see Rule 219).

Rule 203 (Permit to Operate) requires written authorization to operate any equipment, the use of which may cause the issuance of air pollutants, or the use of which may reduce or control the issuance of air contaminants. With respect to the proposed project, this rule would apply to any stationary equipment that is not otherwise exempt from this rule as an insignificant source of air pollutants (see Rule 219).

Rule 219 (Equipment Not Requiring A Written Permit Pursuant to Regulation II) specifies stationary sources that the MDAQMD considers to be insignificant sources of air pollutants that are exempt from Rules 201 and 202. With respect to the proposed project, the following sources would be exempt from permit requirements:

- Comfort air conditioning or ventilating systems which are not designed or used to remove air

contaminants generated by, or released from, specific equipment units;
- Space heaters; and
- Equipment used exclusively for steam cleaning.

Rule 402 (Nuisance). This rule specifies that a person may not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area). This rule requires owners or operators of a construction or demolition fugitive dust source to implement the fugitive dust control measures listed in Rule 403.2. These measures include periodic watering for short-term stabilization of disturbed surface area to minimize visible dust emissions, stabilization of graded surfaces if no development is planned within 30 days, reducing non-essential earth moving activity under high wind conditions, and more. In addition, for sites over 100 acres such as the proposed project, the control measures in Rule 403.2 must also be implemented. The additional control measures include preparing and submitting a dust control plan to the MDAQMD prior to commencing earth-moving activities. The dust control plan must describe all applicable dust control measures that will be implemented at the project site. Other additional control measures to minimize visible fugitive dust for sites over 100 acres include stabilizing access routes, maintaining natural topography to the extent possible, and constructing paved roads and parking lots first where feasible.

Rule 1113 (Architectural Coatings). This rule requires manufacturers, distributors, and end-users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Rule 1160 (Internal Combustion Engines). This rule establishes limits for VOC, NOx, and CO emissions associated with stationary internal combustion engines. However, the provisions of the rule do not apply to the following engines:

- All internal combustion engines rated at less than 500 brake horsepower;
- All internal combustion engines operated less than 100 hours within any continuous four consecutive calendar quarter period; and
- Emergency internal combustion engines.

Regulation XIII (New Source Review). For new and modified stationary sources subject to permitting requirements (see Rule 201), this series of rules prescribes the use of Best Available Control Technology thresholds. The applicability of these requirements would be determined upon submittal of an application for permit to construct under Rule 201.

COUNTY OF SAN BERNARDINO GENERAL PLAN

Local jurisdictions, such as the County of San Bernardino, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the County is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The County is also responsible for the implementation of transportation control measures as outlined in the 2016 AQMP and MDAQMD Attainment Plans. Examples of such measures include bus turnouts, energy- efficient streetlights,

and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, the County assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces implementation of such mitigation.

In accordance with the CEQA requirements, the County does not, however, have the expertise to develop plans, programs, procedures, and methodologies to ensure that air quality within the County and region will meet federal and state standards. Instead, the County relies on the expertise of the SCAQMD and MDAQMD and utilizes the SCAQMD CEQA Handbook and MDAQMD California Environmental Quality Act (CEQA) And Federal Conformity Guidelines (depending on the location/jurisdiction of the project) as guidance documents for the environmental review of plans and development proposals within its jurisdiction.

The County of San Bernardino General Plan contains the following air quality-related goals and policies that are applicable to the proposed project:

Goal CO 4 The County will ensure good air quality for its residents, businesses, and visitors to reduce impacts on human health and the economy.

CO 4.1 Because developments can add to the wind hazard (due to increased dust, the removal of wind breaks, and other factors), the County will require either as mitigation measures in the appropriate environmental analysis required by the County for the development proposal or as conditions of approval if no environmental document is required, that developments in areas identified as susceptible to wind hazards to address site-specific analysis of:

a. Grading restrictions and/or controls on the basis of soil types, topography or season.
b. Landscaping methods, plant varieties, and scheduling to maximize successful revegetation.
c. Dust-control measures during grading, heavy truck travel, and other dust generating activities.

CO 4.2 Coordinate air quality improvement technologies with the South Coast Air Quality Management District (SCAQMD) and the Mojave Desert Air Quality Management District (MDAQMD) to improve air quality through reductions in pollutants from the region.

CO 4.4 Because congestion resulting from growth is expected to result in a significant increase in the air quality degradation, the County may manage growth by insuring the timely provision of infrastructure to serve new development.

Programs

1. Consistent with the land use designations in the Land Use Policy Map (see the Land Use Element) that will improve growth management at a sub-regional level in relation to major activity centers, review new development to encourage new intensified development around transit nodes and along transit corridors.

2. Locate and design new development in a manner that will minimize direct and indirect emission of air contaminants through such means as:

a. Promoting mixed-use development to reduce the length and frequency of vehicle trips;
b. Providing for increased intensity of development along existing and proposed transit corridors; and
c. Providing for the location of ancillary employee services (including but not limited to child care, restaurants, banking facilities, convenience markets) at major employment centers for the purpose of reducing midday vehicle trips.
d. The County shall comply, to the extent feasible, with the recommendations on siting new sensitive land uses, as recommended in California Air Resources Board's Air Quality and Land Use Handbook: A Community Health Perspective, which includes the following:

Notable siting recommendations include avoiding siting new sensitive land uses within:

- 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day;
- 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units per day, or where transport refrigeration units exceed 300 hours per week);
- 1,000 feet of a chrome plater;
- 300 feet of any dry cleaning operation; and 300 feet of a large gas station (defined as a facility with a through put of 3.6 million gallons per year or greater); a 50 foot separation is recommended for typical gas dispensing facilities.

3. Incorporate phasing policies and requirements in the General Plan and development plans to achieve timely provision of infrastructure (particularly transportation facilities) to serve development through:

a. Tying growth to Level of Service (LOS) standards; and
b. Using phasing areas to manage growth.

County of San Bernardino Development Code

§ 83.01.040 Air Quality.

(a) *Equipment Permit and Inspection Requirements.* Required permits shall be obtained from either the Mojave Air Pollution Management District or the South Coast Air Quality Management District depending on the location of the subject property and equipment for equipment that may cause air pollution. Before the equipment may be constructed, plans and specifications shall be submitted to the appropriate District for approval.

(b) *Permits from Air Quality Management Districts.* Permits shall be obtained from either the Mojave Air Pollution Management District or the South Coast Air Quality Management District depending on the location

of the subject property and equipment. If requested by the Director, uses, activities, or processes that require Air Quality Management District approval to operate shall file a copy of the permit with the Department within 30 days of its approval.

(c) *Diesel Exhaust Emissions Control Measures.* The following emissions control measures shall apply to all discretionary land use projects approved by the County on or after January 15, 2009:

(1) *On-Road Diesel Vehicles.* On-road diesel vehicles are regulated by the State of California Air Resources Board.

(2) *Off-Road Diesel Vehicle/Equipment Operations.* All business establishments and contractors that use off-road diesel vehicle/equipment as part of their normal business operations shall adhere to the following measures during their operations in order to reduce diesel particulate matter emissions from diesel-fueled engines:

(A) Off-road vehicles/equipment shall not be left idling on site for periods in excess of five minutes. The idling limit does not apply to:

(I) Idling when queuing;

(II) Idling to verify that the vehicle is in safe operating condition;

(III) Idling for testing, servicing, repairing or diagnostic purposes;

(IV) Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane);

(V) Idling required to bring the machine system to operating temperature; and

(VI) Idling necessary to ensure safe operation of the vehicle.

(B) Use reformulated ultra low-sulfur diesel fuel in equipment and use equipment certified by the U.S. Environmental Protection Agency (EPA) or that pre-dates EPA regulations.

(C) Maintain engines in good working order to reduce emissions.

(D) Signs shall be posted requiring vehicle drivers to turn off engines when parked.

(E) Any requirements or standards subsequently adopted by the South Coast Air Quality Management District, the Mojave Desert Air Quality Management District or the California Air Resources Board.

(F) Provide temporary traffic control during all phases of construction.

(G) On-site electrical power connections shall be provided for electric construction tools to eliminate the need for diesel-powered electric generators, where feasible.

(H) Maintain construction equipment engines in good working order to reduce emissions. The developer shall have each contractor certify that all construction equipment is properly serviced and maintained in good operating condition.

(I) Contractors shall use ultra low sulfur diesel fuel for stationary construction equipment as required by Air Quality Management District (AQMD) Rules 431.1 and 431.2 to reduce the release of undesirable emissions.

(J) Substitute electric and gasoline-powered equipment for diesel-powered equipment, where feasible.

(3) *Project Design.* Distribution centers, warehouses, truck stops and other facilities with loading docks where diesel trucks may reside overnight or for periods in excess of three hours shall be designed to enable any vehicle using these facilities to utilize on-site electrical connections to power the heating and air conditioning of the cabs of such trucks, and any refrigeration unit(s) of any trailer being pulled by the trucks, instead of operating the diesel engines and diesel refrigeration units of such trucks and trailers for these purposes. This requirement shall also apply to Recreational Vehicle Parks (as defined in § 810.01.200(k) of this title) and other development projects where diesel engines may reasonably be expected to operate on other than an occasional basis.

THRESHOLDS OF SIGNIFICANCE

The project is within the MDAB, which is under the jurisdiction of the MDAQMD. According to the MDAQMD, a project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable MDAQMD rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and it is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan).

The MDAQMD currently recommends that projects with construction-related and/or operational emissions that exceed any of the following emissions thresholds as shown in Table 1 should be considered significant. The MDAQMD has identified thresholds of 100,000 tons per year or 548,000 pounds per day of CO2e emissions for individual projects.

TABLE 1: MDAQMD AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Annual Thresholds (tons/year)	Daily Thresholds (pounds/day)
VOC	25	137
NOx	25	137
CO	100	548
SOx	25	137
PM10	15	82
PM2.5	15	82
Lead	0.6	3
Greenhouse Gases (CO2e)	100,000	548,000

Source: http://www.mdaqmd.ca.gov/Modules/ShowDocument.aspx?documentid=2910

CALIFORNIA EMISSIONS ESTIMATOR MODEL™ EMPLOYED TO ANALYZE AIR QUALITY

Emissions are estimated using the CalEEMod (Version 2022.1.1.39) software, which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions from a variety of land use projects. CalEEMod was developed in collaboration with the air districts of California. Regional data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions. The model is considered to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California. CalEEMod output for construction and operational activity are provided in Appendix A.

CONSTRUCTION EMISSIONS

The proposed 32 single-family residential units are anticipated to be constructed in a three phases with 12 units including models in the first phase and 10 units in the second and third phase. The Project is anticipated to have an opening year of 2029. Construction activities associated with the Project will result in emissions of VOCs, NOX, SOX, CO, PM10, and PM2.5. Construction related emissions are expected from the following construction activities:

- Site Preparation
- Grading
- Building Construction
- Architectural Coating
- Paving

GRADING/EXCAVATION ACTIVITIES

Dust is typically a major concern during grading and excavation activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). CalEEMod was utilized to calculate fugitive dust emissions resulting from this phase of activity. This analysis assumes that earthwork activities would result in a balanced earthwork condition with no export or import of soils.

CONSTRUCTION WORKER VEHICLE TRIPS

Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information included in CalEEMod.

CONSTRUCTION DURATION

Construction is expected to commence in January 2027 and will continue through March 2029. The construction schedule utilized in the analysis, shown in Table 2, represents a "worst-case" analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as time passes and the analysis year increases due to emission regulations becoming more stringent. The duration of construction activity and associated equipment represents a reasonable approximation of the expected construction fleet as required per CEQA Guidelines. The duration of construction activities was based on Project specific data provided by the Project owner, where available.

TABLE 2: CONSTRUCTION DURATION

Phase Name	Start Date	End Date	Days
Demolition	01/04/2027	01/13/2027	8
Site Preparation	01/14/2027	01/28/2027	11
Grading	02/01/2027	05/14/2027	75
Building Construction	05/24/2027	03/26/2029	481
Paving	03/22/2028	05/06/2028	33
Architectural Coating	03/12/2029	04/21/2029	30

Source: CalEEMod, Appendix A.

CONSTRUCTION EMISSIONS SUMMARY

CalEEMod calculates maximum daily emissions for summer and winter periods. The estimated maximum daily construction emissions with compliance with Rules 403.2 and 1113 are summarized in Table 3. Detailed construction model outputs are presented in Appendix A. The "mitigated" emissions estimate in Appendix A are utilized to include the emissions reductions from compliance with MDAQMD rules. With the inclusion of these measures regional emissions would be less-than-significant, as shown at Table 3.

TABLE 3: CONSTRUCTION EMISSIONS SUMMARY COMPARED AGAINST THRESHOLDS

Activity	Emissions (lbs/day)					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Maximum Daily Summer Emissions	17.6	36.1	39.6	0.08	8.2	4.2
Maximum Daily Winter Emissions	18.9	36.1	39.0	0.08	8.2	4.2
MDAQMD Regional Threshold	**137**	**137**	**548**	**137**	**82**	**82**
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**
Annual Maximum Emissions	0.33	2.34	2.68	0.005	0.39	0.21
MDAQMD Regional Threshold	**25**	**25**	**100**	**25**	**15**	**15**
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod, Appendix A.

OPERATIONAL EMISSIONS

Operational or long-term emissions occur over the life of the Project. Both mobile and area sources generate operational emissions. Area source emissions arise from consumer product usage, heaters that consume natural gas, gasoline-powered landscape equipment, and architectural coatings (painting). Mobile source emissions from motor vehicles are the largest single long-term source of air pollutants from the operation of the Project. Small amounts of emissions would also occur from area sources such as the consumption of propane for heating, from landscaping emissions, and consumer product usage. The operational emissions were estimated using the latest version of CalEEMod.

Mobile Sources

Mobile sources include emissions from the additional vehicle miles generated from the proposed Project. The project will generate approximately 302 weekday trips per day. The program then applies the emission factors for each trip which is provided by the EMFAC2017 model to determine the vehicular traffic pollutant emissions. The CalEEMod default trip lengths were used in this analysis. Please see CalEEMod output comments sections in Appendix A for details.

Area Sources

Area sources include emissions from consumer products, landscape equipment and architectural coatings. Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors,

generators, and pumps. As specifics were not known about the landscaping equipment fleet, CalEEMod defaults were used to estimate emissions from landscaping equipment.

Per MDAQMD Rule 1113 as amended on April 23, 2012, the architectural coatings that would be applied after January 1, 2013 will be limited to an average of 150 grams per liter or less.

Energy Usage

2022.1.1.39 CalEEMod defaults were utilized.

OPERATIONAL EMISSIONS SUMMARY

The operations-related criteria air quality impacts created by the proposed project have been analyzed through the use of CalEEMod model. The operating emissions were based on year 2025, which is a conservative estimate of the opening year for the project. The summer and winter emissions created by the proposed project's long-term operations were calculated and the highest emissions from either summer or winter are summarized in Table 4.

TABLE 4: REGIONAL SIGNIFICANCE - OPERATIONAL EMISSIONS (TONS/YEAR)

Activity	Pollutant Emissions (tons/year)[1]					
	VOC	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
Area Sources[2]	0.29	0.002	0.16	0.00001	0.00008	0.00006
Energy Usage	0.005	0.05	0.02	0.0003	0.004	0.004
Mobile Sources[3]	0.24	0.29	2.11	0.006	0.61	0.16
Total Emissions	**0.53**	**0.34**	**2.29**	**0.006**	**0.61**	**0.16**
MDAQMD Annual Thresholds	**25**	**25**	**100**	**25**	**15**	**12**
Exceeds Threshold?	No	No	No	No	No	No

Notes:
[1] Source: CalEEMod Version 2022.1.1.39
[2] Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.
[3] Mobile sources consist of emissions from vehicles and road dust.

Table 4 provides the project's unmitigated operational emissions. Table 4 shows that the project does not exceed the MDAQMD regional emissions thresholds. Therefore, operational emissions are considered to be less than significant.

CONCLUSIONS

Air pollutant emissions associated with the proposed Project have been evaluated to determine the level of impact from construction activities and future operations of the proposed Project.

CONSTRUCTION

Construction of the proposed Project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project site. In addition, fugitive dust emissions would result from grading and construction activities. As shown in Table 3, construction-related daily regional and localized emissions would not exceed MDAQMD significance thresholds. Therefore, construction impacts would be less than significant.

OPERATION

Air pollutant emissions associated with proposed Project operations would be generated by the consumption of electricity and by the operation of on-road vehicles. As shown in Table 4, regional and localized emissions associated with the proposed Project would not exceed the MDAQMD daily significance thresholds. Therefore, operational impacts would be less than significant.

Appendix A – CalEEMod Run Sheets

Joshua Tree Estates -Tentative Tract Map 20668 v2 Custom Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

2.2. Construction Emissions by Year

2.2.1. Total Construction Emissions by Year, Unmitigated

2.2.2. Onsite Construction Emissions by Year, Unmitigated

2.2.3. Offsite Construction Emissions by Year, Unmitigated

2.2.4. Total Construction Emissions by Year, Mitigated

2.2.5. Onsite Construction Emissions by Year, Mitigated

2.2.6. Offsite Construction Emissions by Year, Mitigated

2.3. Operations Emissions Compared Against Thresholds

2.4. Operations Emissions by Sector, Unmitigated

2.5. Operations Emissions by Sector, Mitigated

3. Construction Emissions Details

3.1. Demolition (2027)

3.1.1. Onsite - Unmitigated

3.1.2. Offsite - Unmitigated

3.1.3. Onsite - Mitigated

3.1.4. Offsite - Mitigated

3.2. Site Preparation (2027)

3.2.1. Onsite - Unmitigated

3.2.2. Offsite - Unmitigated

3.2.3. Onsite - Mitigated

3.2.4. Offsite - Mitigated

3.3. Grading (2027)

3.3.1. Onsite - Unmitigated

3.3.2. Offsite - Unmitigated

3.3.3. Onsite - Mitigated

3.3.4. Offsite - Mitigated

3.4. Building Construction- P1 (2027)

3.4.1. Onsite - Unmitigated

3.4.2. Offsite - Unmitigated

3.4.3. Onsite - Mitigated

3.4.4. Offsite - Mitigated

3.5. Building Construction- P1 (2028)

3.5.1. Onsite - Unmitigated

3.5.2. Offsite - Unmitigated

3.5.3. Onsite - Mitigated

3.5.4. Offsite - Mitigated

3.6. Building Construction- P1 (2029)

3.6.1. Onsite - Unmitigated

3.6.2. Offsite - Unmitigated

3.6.3. Onsite - Mitigated

3.6.4. Offsite - Mitigated

3.7. Paving (2028)

3.7.1. Onsite - Unmitigated

3.7.2. Offsite - Unmitigated

3.7.3. Onsite - Mitigated

3.7.4. Offsite - Mitigated

3.8. Architectural Coating-1 (2028)

3.8.1. Onsite - Unmitigated

3.8.2. Offsite - Unmitigated

3.8.3. Onsite - Mitigated

3.8.4. Offsite - Mitigated

3.9. Architectural Coating-2 (2028)

3.9.1. Onsite - Unmitigated

3.9.2. Offsite - Unmitigated

3.9.3. Onsite - Mitigated

3.9.4. Offsite - Mitigated

3.10. Architectural Coating-3 (2029)

3.10.1. Onsite - Unmitigated

3.10.2. Offsite - Unmitigated

3.10.3. Onsite - Mitigated

3.10.4. Offsite - Mitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.1.2. Mitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.2. Electricity Emissions By Land Use - Mitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.2.4. Natural Gas Emissions By Land Use - Mitigated

4.3. Area Emissions by Source

4.3.1. Unmitigated

4.3.2. Mitigated

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

4.4.2. Mitigated

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

4.5.2. Mitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.2.2. Mitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.3.2. Mitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.9.2. Mitigated

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.11.2. Mitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.12.2. Mitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.13.2. Mitigated

8. User Changes to Default Data

8.1. Justifications

8.3. Land Use

8.4. Construction

8.4.1. Construction Phases

8.4.2. Off-Road Equipment

8.4.4. Dust from Material Movement

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Joshua Tree Estates -Tentative Tract Map 20668 v2
Construction Start Date	1/4/2027
Operational Year	2029
Lead Agency	San Bernardino County
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60000
Precipitation (days)	12.2000
Location	34.16301544610043, -116.26966457605005
County	San Bernardino-Mojave Desert
City	Unincorporated
Air District	Mojave Desert AQMD
Air Basin	Mojave Desert
TAZ	5143
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.39

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Single Family Housing	32.0000	Dwelling Unit	70.2000	77,405.0	0.00000	0.00000	78.0000	—

Other Asphalt Surfaces	11.0000	Acre	11.0000	0.00000	0.00000	0.00000	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-13	Use Low-VOC Paints for Construction
Energy	E-2	Require Energy Efficient Appliances
Energy	E-10-B	Establish Onsite Renewable Energy Systems: Solar Power
Energy	E-15	Require All-Electric Development
Water	W-5	Design Water-Efficient Landscapes
Water	W-7	Adopt a Water Conservation Strategy
Waste	S-4*	Recycle Demolished Construction Material
Area Sources	AS-1	Use Low-VOC Cleaning Supplies

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	22.3333	22.0629	45.9621	49.9287	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,813.0	10,813.0	0.42512	0.09942	10,854.7
Mit.	22.3333	22.0629	45.9621	49.9287	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,813.0	10,813.0	0.42512	0.09942	10,854.7
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Unmit.	21.3821	21.3391	45.9768	49.1667	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,760.8	10,760.8	0.42655	0.10014	10,801.4
Mit.	21.3821	21.3391	45.9768	49.1667	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,760.8	10,760.8	0.42655	0.10014	10,801.4
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.20837	2.04451	14.8410	16.7974	0.03203	0.58764	2.15655	2.74418	0.54068	0.95717	1.49785	—	3,509.20	3,509.20	0.13665	0.03894	3,524.49
Mit.	2.20837	2.04451	14.8410	16.7974	0.03203	0.58764	2.15655	2.74418	0.54068	0.95717	1.49785	—	3,509.20	3,509.20	0.13665	0.03894	3,524.49
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.40303	0.37312	2.70849	3.06552	0.00584	0.10724	0.39357	0.50081	0.09867	0.17468	0.27336	—	580.987	580.987	0.02262	0.00645	583.520
Mit.	0.40303	0.37312	2.70849	3.06552	0.00584	0.10724	0.39357	0.50081	0.09867	0.17468	0.27336	—	580.987	580.987	0.02262	0.00645	583.520
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year

2.2.1. Total Construction Emissions by Year, Unmitigated

Includes both onsite and offsite emissions.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.38164	5.37298	45.9621	49.9287	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,813.0	10,813.0	0.42512	0.09942	10,854.7
2028	22.3333	22.0629	14.9206	21.8489	0.03566	0.50261	0.34323	0.84584	0.46252	0.08168	0.54420	—	3,930.74	3,930.74	0.14582	0.05352	3,951.49
2029	21.3821	21.3391	1.58831	2.22431	0.00345	0.02568	0.00000	0.02568	0.02363	0.00000	0.02363	—	267.019	267.019	0.01083	0.00217	267.936

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.36731	5.35793	45.9768	49.1667	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,760.8	10,760.8	0.42655	0.10014	10,801.4
2028	19.5036	19.2388	14.9371	21.3235	0.03566	0.50261	0.34323	0.84584	0.46252	0.08168	0.54420	—	3,893.07	3,893.07	0.14635	0.05352	3,912.71
2029	21.3821	21.3391	9.32996	12.8354	0.02462	0.28617	0.17985	0.46601	0.26340	0.04338	0.30678	—	2,539.08	2,539.08	0.09563	0.03712	2,552.55
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	2.05816	1.72825	14.8410	16.7974	0.03203	0.58764	2.15655	2.74418	0.54068	0.95717	1.49785	—	3,509.20	3,509.20	0.13665	0.03894	3,524.49
2028	2.20837	2.04451	7.20557	9.72995	0.01823	0.23088	0.13450	0.36538	0.21250	0.03239	0.24489	—	1,890.11	1,890.11	0.07095	0.02786	1,900.40
2029	0.80569	0.76900	1.59618	2.20516	0.00419	0.04831	0.02969	0.07799	0.04446	0.00716	0.05162	—	430.328	430.328	0.01620	0.00623	432.633
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.37561	0.31541	2.70849	3.06552	0.00584	0.10724	0.39357	0.50081	0.09867	0.17468	0.27336	—	580.987	580.987	0.02262	0.00645	583.520
2028	0.40303	0.37312	1.31502	1.77572	0.00333	0.04214	0.02455	0.06668	0.03878	0.00591	0.04469	—	312.930	312.930	0.01175	0.00461	314.633
2029	0.14704	0.14034	0.29130	0.40244	0.00076	0.00882	0.00542	0.01423	0.00811	0.00131	0.00942	—	71.2457	71.2457	0.00268	0.00103	71.6274

2.2.2. Onsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	8.90702	10.8389	1.77736	4.07393	5.85129	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
2028	22.2617	21.9990	14.7369	20.2141	0.03482	0.50107	0.00000	0.50107	0.46098	0.00000	0.46098	—	3,497.82	3,497.82	0.14189	0.02838	3,509.83
2029	21.3821	21.3391	1.58831	2.22431	0.00345	0.02568	0.00000	0.02568	0.02363	0.00000	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	8.90702	10.8389	1.77736	4.07393	5.85129	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
2028	19.4536	19.1909	14.7369	20.2141	0.03482	0.50107	0.00000	0.50107	0.46098	0.00000	0.46098	—	3,497.82	3,497.82	0.14189	0.02838	3,509.83
2029	21.3821	21.3391	9.18776	12.3175	0.02377	0.28463	0.00000	0.28463	0.26186	0.00000	0.26186	—	2,301.84	2,301.84	0.09337	0.01867	2,309.74

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.99998	1.67668	14.7346	16.1186	0.03166	0.58697	1.98423	2.57120	0.54001	0.91627	1.45628	—	3,306.03	3,306.03	0.13411	0.02682	3,317.38
2028	2.16996	2.00769	7.09220	9.26480	0.01762	0.22978	0.00000	0.22978	0.21140	0.00000	0.21140	—	1,706.97	1,706.97	0.06924	0.01385	1,712.83
2029	0.79766	0.76131	1.57181	2.10983	0.00405	0.04805	0.00000	0.04805	0.04421	0.00000	0.04421	—	390.205	390.205	0.01583	0.00317	391.545
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.36500	0.30599	2.68906	2.94165	0.00578	0.10712	0.36212	0.46924	0.09855	0.16722	0.26577	—	547.351	547.351	0.02220	0.00444	549.230
2028	0.39602	0.36640	1.29433	1.69083	0.00322	0.04193	0.00000	0.04193	0.03858	0.00000	0.03858	—	282.609	282.609	0.01146	0.00229	283.579
2029	0.14557	0.13894	0.28686	0.38504	0.00074	0.00877	0.00000	0.00877	0.00807	0.00000	0.00807	—	64.6030	64.6030	0.00262	0.00052	64.8247

2.2.3. Offsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.16300	0.14760	0.14868	2.31789	0.00084	0.00154	0.42481	0.42481	0.00154	0.09957	0.09957	—	456.670	456.670	0.00502	0.01922	462.807
2028	0.12117	0.10864	0.18369	1.63481	0.00084	0.00154	0.34323	0.34477	0.00154	0.08168	0.08322	—	432.911	432.911	0.00393	0.02514	441.660
2029	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.14867	0.13255	0.15952	1.55588	0.00084	0.00154	0.42481	0.42481	0.00154	0.09957	0.09957	—	404.468	404.468	0.00645	0.01955	409.471
2028	0.09988	0.09669	0.20019	1.10944	0.00084	0.00154	0.34323	0.34477	0.00154	0.08168	0.08322	—	395.246	395.246	0.00446	0.02514	402.880
2029	0.04764	0.04085	0.14220	0.51794	0.00084	0.00154	0.17985	0.18138	0.00154	0.04338	0.04492	—	237.236	237.236	0.00226	0.01845	242.805
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.05817	0.05157	0.10648	0.67876	0.00037	0.00067	0.17231	0.17298	0.00067	0.04090	0.04157	—	203.163	203.163	0.00254	0.01212	207.115
2028	0.03841	0.03682	0.11338	0.46515	0.00060	0.00110	0.13450	0.13561	0.00110	0.03239	0.03349	—	183.138	183.138	0.00171	0.01401	187.570
2029	0.00803	0.00769	0.02437	0.09533	0.00014	0.00026	0.02969	0.02994	0.00026	0.00716	0.00741	—	40.1225	40.1225	0.00038	0.00307	41.0889

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.01062	0.00941	0.01943	0.12387	0.00007	0.00012	0.03145	0.03157	0.00012	0.00746	0.00759	—	33.6359	33.6359	0.00042	0.00201	34.2903
2028	0.00701	0.00672	0.02069	0.08489	0.00011	0.00020	0.02455	0.02475	0.00020	0.00591	0.00611	—	30.3205	30.3205	0.00028	0.00232	31.0543
2029	0.00147	0.00140	0.00445	0.01740	0.00003	0.00005	0.00542	0.00546	0.00005	0.00131	0.00135	—	6.64273	6.64273	0.00006	0.00051	6.80273

2.2.4. Total Construction Emissions by Year, Mitigated

Includes both onsite and offsite emissions.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.38164	5.37298	45.9621	49.9287	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,813.0	10,813.0	0.42512	0.09942	10,854.7
2028	22.3333	22.0629	14.9206	21.8489	0.03566	0.50261	0.34323	0.84584	0.46252	0.08168	0.54420	—	3,930.74	3,930.74	0.14582	0.05352	3,951.49
2029	21.3821	21.3391	1.58831	2.22431	0.00345	0.02568	0.00000	0.02568	0.02363	0.00000	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.36731	5.35793	45.9768	49.1667	0.09562	1.93191	9.33182	11.2637	1.77736	4.17350	5.95086	—	10,760.8	10,760.8	0.42655	0.10014	10,801.4
2028	19.5036	19.2388	14.9371	21.3235	0.03566	0.50261	0.34323	0.84584	0.46252	0.08168	0.54420	—	3,893.07	3,893.07	0.14635	0.05352	3,912.71
2029	21.3821	21.3391	9.32996	12.8354	0.02462	0.28617	0.17985	0.46601	0.26340	0.04338	0.30678	—	2,539.08	2,539.08	0.09563	0.03712	2,552.55
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	2.05816	1.72825	14.8410	16.7974	0.03203	0.58764	2.15655	2.74418	0.54068	0.95717	1.49785	—	3,509.20	3,509.20	0.13665	0.03894	3,524.49
2028	2.20837	2.04451	7.20557	9.72995	0.01823	0.23088	0.13450	0.36538	0.21250	0.03239	0.24489	—	1,890.11	1,890.11	0.07095	0.02786	1,900.40
2029	0.80569	0.76900	1.59618	2.20516	0.00419	0.04831	0.02969	0.07799	0.04446	0.00716	0.05162	—	430.328	430.328	0.01620	0.00623	432.633
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.37561	0.31541	2.70849	3.06552	0.00584	0.10724	0.39357	0.50081	0.09867	0.17468	0.27336	—	580.987	580.987	0.02262	0.00645	583.520
2028	0.40303	0.37312	1.31502	1.77572	0.00333	0.04214	0.02455	0.06668	0.03878	0.00591	0.04469	—	312.930	312.930	0.01175	0.00461	314.633
2029	0.14704	0.14034	0.29130	0.40244	0.00076	0.00882	0.00542	0.01423	0.00811	0.00131	0.00942	—	71.2457	71.2457	0.00268	0.00103	71.6274

2.2.5. Onsite Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	8.90702	10.8389	1.77736	4.07393	5.85129	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
2028	22.2617	21.9990	14.7369	20.2141	0.03482	0.50107	0.00000	0.50107	0.46098	0.00000	0.46098	—	3,497.82	3,497.82	0.14189	0.02838	3,509.83
2029	21.3821	21.3391	1.58831	2.22431	0.00345	0.02568	0.00000	0.02568	0.02363	0.00000	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	8.90702	10.8389	1.77736	4.07393	5.85129	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
2028	19.4536	19.1909	14.7369	20.2141	0.03482	0.50107	0.00000	0.50107	0.46098	0.00000	0.46098	—	3,497.82	3,497.82	0.14189	0.02838	3,509.83
2029	21.3821	21.3391	9.18776	12.3175	0.02377	0.28463	0.00000	0.28463	0.26186	0.00000	0.26186	—	2,301.84	2,301.84	0.09337	0.01867	2,309.74
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.99998	1.67668	14.7346	16.1186	0.03166	0.58697	1.98423	2.57120	0.54001	0.91627	1.45628	—	3,306.03	3,306.03	0.13411	0.02682	3,317.38
2028	2.16996	2.00769	7.09220	9.26480	0.01762	0.22978	0.00000	0.22978	0.21140	0.00000	0.21140	—	1,706.97	1,706.97	0.06924	0.01385	1,712.83
2029	0.79766	0.76131	1.57181	2.10983	0.00405	0.04805	0.00000	0.04805	0.04421	0.00000	0.04421	—	390.205	390.205	0.01583	0.00317	391.545
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.36500	0.30599	2.68906	2.94165	0.00578	0.10712	0.36212	0.46924	0.09855	0.16722	0.26577	—	547.351	547.351	0.02220	0.00444	549.230
2028	0.39602	0.36640	1.29433	1.69083	0.00322	0.04193	0.00000	0.04193	0.03858	0.00000	0.03858	—	282.609	282.609	0.01146	0.00229	283.579
2029	0.14557	0.13894	0.28686	0.38504	0.00074	0.00877	0.00000	0.00877	0.00807	0.00000	0.00807	—	64.6030	64.6030	0.00262	0.00052	64.8247

2.2.6. Offsite Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.16300	0.14760	0.14868	2.31789	0.00084	0.00154	0.42481	0.42481	0.00154	0.09957	0.09957	—	456.670	456.670	0.00502	0.01922	462.807
2028	0.12117	0.10864	0.18369	1.63481	0.00084	0.00154	0.34323	0.34477	0.00154	0.08168	0.08322	—	432.911	432.911	0.00393	0.02514	441.660
2029	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.14867	0.13255	0.15952	1.55588	0.00084	0.00154	0.42481	0.42481	0.00154	0.09957	0.09957	—	404.468	404.468	0.00645	0.01955	409.471
2028	0.09988	0.09669	0.20019	1.10944	0.00084	0.00154	0.34323	0.34477	0.00154	0.08168	0.08322	—	395.246	395.246	0.00446	0.02514	402.880
2029	0.04764	0.04085	0.14220	0.51794	0.00084	0.00154	0.17985	0.18138	0.00154	0.04338	0.04492	—	237.236	237.236	0.00226	0.01845	242.805
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.05817	0.05157	0.10648	0.67876	0.00037	0.00067	0.17231	0.17298	0.00067	0.04090	0.04157	—	203.163	203.163	0.00254	0.01212	207.115
2028	0.03841	0.03682	0.11338	0.46515	0.00060	0.00110	0.13450	0.13561	0.00110	0.03239	0.03349	—	183.138	183.138	0.00171	0.01401	187.570
2029	0.00803	0.00769	0.02437	0.09533	0.00014	0.00026	0.02969	0.02994	0.00026	0.00716	0.00741	—	40.1225	40.1225	0.00038	0.00307	41.0889
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.01062	0.00941	0.01943	0.12387	0.00007	0.00012	0.03145	0.03157	0.00012	0.00746	0.00759	—	33.6359	33.6359	0.00042	0.00201	34.2903
2028	0.00701	0.00672	0.02069	0.08489	0.00011	0.00020	0.02455	0.02475	0.00020	0.00591	0.00611	—	30.3205	30.3205	0.00028	0.00232	31.0543
2029	0.00147	0.00140	0.00445	0.01740	0.00003	0.00005	0.00542	0.00546	0.00005	0.00131	0.00135	—	6.64273	6.64273	0.00006	0.00051	6.80273

2.3. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.56290	3.41726	1.72960	16.3043	0.03950	0.04853	3.40390	3.45243	0.04673	0.86246	0.90919	14.8295	4,541.06	4,555.89	1.64682	0.16044	4,655.42
Mit.	3.40947	3.27862	1.47679	16.1967	0.03789	0.02809	3.40390	3.43199	0.02629	0.86246	0.88875	14.8295	4,224.81	4,239.64	1.61871	0.15987	4,338.29

% Reduced	4%	4%	15%	1%	4%	42%	—	1%	44%	—	2%	—	7%	7%	2%	—	7%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.25437	3.11872	1.82844	11.0327	0.03607	0.04770	3.40390	3.45161	0.04611	0.86246	0.90857	14.8295	4,196.70	4,211.53	1.64981	0.16564	4,302.95
Mit.	3.10094	2.98008	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	14.8295	3,880.45	3,895.28	1.62170	0.16507	3,985.82
% Reduced	5%	4%	14%	1%	4%	43%	—	1%	44%	—	2%	—	8%	8%	2%	—	7%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.31437	3.17588	1.83984	12.5909	0.03608	0.04750	3.30184	3.34934	0.04584	0.83669	0.88253	14.8295	4,196.31	4,211.13	1.64881	0.16442	4,306.13
Mit.	3.16094	3.03724	1.58704	12.4833	0.03447	0.02706	3.30184	3.32890	0.02540	0.83669	0.86209	14.8295	3,880.05	3,894.88	1.62070	0.16385	3,989.00
% Reduced	5%	4%	14%	1%	4%	43%	—	1%	45%	—	2%	—	8%	8%	2%	—	7%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.60487	0.57960	0.33577	2.29783	0.00659	0.00867	0.60258	0.61125	0.00837	0.15270	0.16106	2.45519	694.746	697.201	0.27298	0.02722	712.928
Mit.	0.57687	0.55430	0.28963	2.27820	0.00629	0.00494	0.60258	0.60752	0.00464	0.15270	0.15733	2.45519	642.387	644.842	0.26833	0.02713	660.424
% Reduced	5%	4%	14%	1%	4%	43%	—	1%	45%	—	2%	—	8%	8%	2%	< 0.5%	7%

2.4. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.50357	1.38156	1.45973	14.3764	0.03781	0.02725	3.40390	3.43116	0.02566	0.86246	0.88812	—	3,849.21	3,849.21	0.10673	0.15082	3,906.82
Area	2.02975	2.02091	0.01706	1.82028	0.00008	0.00084	—	0.00084	0.00063	—	0.00063	—	4.85399	4.85399	0.00020	0.00004	4.87107
Energy	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	675.802	675.802	0.05041	0.00327	678.038

Water	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Waste	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.55437
Total	3.56290	3.41726	1.72960	16.3043	0.03950	0.04853	3.40390	3.45243	0.04673	0.86246	0.90919	14.8295	4,541.06	4,555.89	1.64682	0.16044	4,655.42
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.36139	1.24052	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	—	3,509.71	3,509.71	0.10992	0.15605	3,559.22
Area	1.86341	1.86341	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	675.802	675.802	0.05041	0.00327	678.038
Water	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Waste	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.55437
Total	3.25437	3.11872	1.82844	11.0327	0.03607	0.04770	3.40390	3.45161	0.04611	0.86246	0.90857	14.8295	4,196.70	4,211.53	1.64981	0.16564	4,302.95
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.33934	1.22001	1.57862	11.5856	0.03443	0.02665	3.30184	3.32848	0.02509	0.83669	0.86177	—	3,506.92	3,506.92	0.10882	0.15482	3,559.99
Area	1.94544	1.94108	0.00841	0.89767	0.00004	0.00041	—	0.00041	0.00031	—	0.00031	—	2.39375	2.39375	0.00010	0.00002	2.40217
Energy	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	675.802	675.802	0.05041	0.00327	678.038
Water	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Waste	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.55437
Total	3.31437	3.17588	1.83984	12.5909	0.03608	0.04750	3.30184	3.34934	0.04584	0.83669	0.88253	14.8295	4,196.31	4,211.13	1.64881	0.16442	4,306.13
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.24443	0.22265	0.28810	2.11437	0.00628	0.00486	0.60258	0.60745	0.00458	0.15270	0.15727	—	580.610	580.610	0.01802	0.02563	589.397
Area	0.35504	0.35425	0.00154	0.16383	0.00001	0.00008	—	0.00008	0.00006	—	0.00006	—	0.39631	0.39631	0.00002	< 0.000005	0.39771
Energy	0.00540	0.00270	0.04614	0.01963	0.00029	0.00373	—	0.00373	0.00373	—	0.00373	—	111.887	111.887	0.00835	0.00054	112.257
Water	—	—	—	—	—	—	—	—	—	—	—	0.42315	1.85320	2.27635	0.04350	0.00104	3.67533
Waste	—	—	—	—	—	—	—	—	—	—	—	2.03204	0.00000	2.03204	0.20310	0.00000	7.10942

Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.09178
Total	0.60487	0.57960	0.33577	2.29783	0.00659	0.00867	0.60258	0.61125	0.00837	0.15270	0.16106	2.45519	694.746	697.201	0.27298	0.02722	712.928

2.5. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.50357	1.38156	1.45973	14.3764	0.03781	0.02725	3.40390	3.43116	0.02566	0.86246	0.88812	—	3,849.21	3,849.21	0.10673	0.15082	3,906.82
Area	1.90591	1.89706	0.01706	1.82028	0.00008	0.00084	—	0.00084	0.00063	—	0.00063	—	4.85399	4.85399	0.00020	0.00004	4.87107
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	359.547	359.547	0.02230	0.00270	360.910
Water	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Waste	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.55437
Total	3.40947	3.27862	1.47679	16.1967	0.03789	0.02809	3.40390	3.43199	0.02629	0.86246	0.88875	14.8295	4,224.81	4,239.64	1.61871	0.15987	4,338.29
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.36139	1.24052	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	—	3,509.71	3,509.71	0.10992	0.15605	3,559.22
Area	1.73956	1.73956	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	359.547	359.547	0.02230	0.00270	360.910
Water	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Waste	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.55437
Total	3.10094	2.98008	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	14.8295	3,880.45	3,895.28	1.62170	0.16507	3,985.82
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.33934	1.22001	1.57862	11.5856	0.03443	0.02665	3.30184	3.32848	0.02509	0.83669	0.86177	—	3,506.92	3,506.92	0.10882	0.15482	3,559.99
Area	1.82159	1.81723	0.00841	0.89767	0.00004	0.00041	—	0.00041	0.00031	—	0.00031	—	2.39375	2.39375	0.00010	0.00002	2.40217

Energy	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	359.547	359.547	0.02230	0.00270	360.910
Water	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Waste	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.55437
Total	3.16094	3.03724	1.58704	12.4833	0.03447	0.02706	3.30184	3.32890	0.02540	0.83669	0.86209	14.8295	3,880.05	3,894.88	1.62070	0.16385	3,989.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.24443	0.22265	0.28810	2.11437	0.00628	0.00486	0.60258	0.60745	0.00458	0.15270	0.15727	—	580.610	580.610	0.01802	0.02563	589.397
Area	0.33244	0.33164	0.00154	0.16383	0.00001	0.00008	—	0.00008	0.00006	—	0.00006	—	0.39631	0.39631	0.00002	< 0.000005	0.39771
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	59.5271	59.5271	0.00369	0.00045	59.7528
Water	—	—	—	—	—	—	—	—	—	—	—	0.42315	1.85320	2.27635	0.04350	0.00104	3.67533
Waste	—	—	—	—	—	—	—	—	—	—	—	2.03204	0.00000	2.03204	0.20310	0.00000	7.10942
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.09178
Total	0.57687	0.55430	0.28963	2.27820	0.00629	0.00494	0.60258	0.60752	0.00464	0.15270	0.15733	2.45519	642.387	644.842	0.26833	0.02713	660.424

3. Construction Emissions Details

3.1. Demolition (2027)

3.1.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.73090	2.28917	20.5453	19.4366	0.03438	0.80456	—	0.80456	0.74019	—	0.74019	—	3,529.19	3,529.19	0.14316	0.02863	3,541.30

Demolition	—	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05986	0.05017	0.45031	0.42601	0.00075	0.01763	—	0.01763	0.01622	—	0.01622	—	77.3522	77.3522	0.00314	0.00063	77.6176
Demolition	—	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01092	0.00916	0.08218	0.07775	0.00014	0.00322	—	0.00322	0.00296	—	0.00296	—	12.8065	12.8065	0.00052	0.00010	12.8505
Demolition	—	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06862	0.06118	0.06597	0.71810	0.00000	0.00000	0.19606	0.19606	0.00000	0.04596	0.04596	—	186.678	186.678	0.00298	0.00744	188.986
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00150	0.00134	0.00158	0.01761	0.00000	0.00000	0.00426	0.00426	0.00000	0.00100	0.00100	—	4.21181	4.21181	0.00007	0.00016	4.26825
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00027	0.00024	0.00029	0.00321	0.00000	0.00000	0.00078	0.00078	0.00000	0.00018	0.00018	—	0.69731	0.69731	0.00001	0.00003	0.70666
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.73090	2.28917	20.5453	19.4366	0.03438	0.80456	—	0.80456	0.74019	—	0.74019	—	3,529.19	3,529.19	0.14316	0.02863	3,541.30
Demolition	—	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05986	0.05017	0.45031	0.42601	0.00075	0.01763	—	0.01763	0.01622	—	0.01622	—	77.3522	77.3522	0.00314	0.00063	77.6176
Demolition	—	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01092	0.00916	0.08218	0.07775	0.00014	0.00322	—	0.00322	0.00296	—	0.00296	—	12.8065	12.8065	0.00052	0.00010	12.8505
Demolition	—	—	—	—	—	—	0.00000	0.00000	—	0.00000	0.00000	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06862	0.06118	0.06597	0.71810	0.00000	0.00000	0.19606	0.19606	0.00000	0.04596	0.04596	—	186.678	186.678	0.00298	0.00744	188.986
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00150	0.00134	0.00158	0.01761	0.00000	0.00000	0.00426	0.00426	0.00000	0.00100	0.00100	—	4.21181	4.21181	0.00007	0.00016	4.26825
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00027	0.00024	0.00029	0.00321	0.00000	0.00000	0.00078	0.00078	0.00000	0.00018	0.00018	—	0.69731	0.69731	0.00001	0.00003	0.70666
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.2. Site Preparation (2027)

3.2.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.34413	1.96972	17.9878	17.5786	0.03082	0.76127	—	0.76127	0.70037	—	0.70037	—	3,338.34	3,338.34	0.13542	0.02708	3,349.79
Dust From Material Movement	—	—	—	—	—	—	5.11082	5.11082	—	2.62664	2.62664	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07065	0.05936	0.54210	0.52977	0.00093	0.02294	—	0.02294	0.02111	—	0.02111	—	100.607	100.607	0.00408	0.00082	100.953
Dust From Material Movement	—	—	—	—	—	—	0.15402	0.15402	—	0.07916	0.07916	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01289	0.01083	0.09893	0.09668	0.00017	0.00419	—	0.00419	0.00385	—	0.00385	—	16.6567	16.6567	0.00068	0.00014	16.7139
Dust From Material Movement	—	—	—	—	—	—	0.02811	0.02811	—	0.01445	0.01445	—	—	—	—	—	—

Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04575	0.04079	0.04398	0.47873	0.00000	0.00000	0.13071	0.13071	0.00000	0.03064	0.03064	—	124.452	124.452	0.00198	0.00496	125.991
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00138	0.00123	0.00145	0.01615	0.00000	0.00000	0.00391	0.00391	0.00000	0.00092	0.00092	—	3.86082	3.86082	0.00006	0.00015	3.91256
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00025	0.00022	0.00026	0.00295	0.00000	0.00000	0.00071	0.00071	0.00000	0.00017	0.00017	—	0.63920	0.63920	0.00001	0.00002	0.64777
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.34413	1.96972	17.9878	17.5786	0.03082	0.76127	—	0.76127	0.70037	—	0.70037	—	3,338.34	3,338.34	0.13542	0.02708	3,349.79
Dust From Material Movement	—	—	—	—	—	—	5.11082	5.11082	—	2.62664	2.62664	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07065	0.05936	0.54210	0.52977	0.00093	0.02294	—	0.02294	0.02111	—	0.02111	—	100.607	100.607	0.00408	0.00082	100.953
Dust From Material Movement	—	—	—	—	—	—	0.15402	0.15402	—	0.07916	0.07916	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01289	0.01083	0.09893	0.09668	0.00017	0.00419	—	0.00419	0.00385	—	0.00385	—	16.6567	16.6567	0.00068	0.00014	16.7139
Dust From Material Movement	—	—	—	—	—	—	0.02811	0.02811	—	0.01445	0.01445	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04575	0.04079	0.04398	0.47873	0.00000	0.00000	0.13071	0.13071	0.00000	0.03064	0.03064	—	124.452	124.452	0.00198	0.00496	125.991
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00138	0.00123	0.00145	0.01615	0.00000	0.00000	0.00391	0.00391	0.00000	0.00092	0.00092	—	3.86082	3.86082	0.00006	0.00015	3.91256
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00025	0.00022	0.00026	0.00295	0.00000	0.00000	0.00071	0.00071	0.00000	0.00017	0.00017	—	0.63920	0.63920	0.00001	0.00002	0.64777
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.3. Grading (2027)

3.3.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	—	1.93191	1.77736	—	1.77736	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9

Dust From Material Movement	—	—	—	—	—	—	8.90702	8.90702	—	4.07393	4.07393	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	—	1.93191	1.77736	—	1.77736	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
Dust From Material Movement	—	—	—	—	—	—	8.90702	8.90702	—	4.07393	4.07393	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.27780	1.07371	9.41792	9.78304	0.01965	0.39697	—	0.39697	0.36521	—	0.36521	—	2,128.02	2,128.02	0.08632	0.01726	2,135.33
Dust From Material Movement	—	—	—	—	—	—	1.83021	1.83021	—	0.83711	0.83711	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23320	0.19595	1.71877	1.78541	0.00359	0.07245	—	0.07245	0.06665	—	0.06665	—	352.318	352.318	0.01429	0.00286	353.528
Dust From Material Movement	—	—	—	—	—	—	0.33401	0.33401	—	0.15277	0.15277	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16300	0.14760	0.12825	2.31789	0.00000	0.00000	0.42481	0.42481	0.00000	0.09957	0.09957	—	456.670	456.670	0.00502	0.01540	462.807
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14867	0.13255	0.14294	1.55588	0.00000	0.00000	0.42481	0.42481	0.00000	0.09957	0.09957	—	404.468	404.468	0.00645	0.01612	409.471
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03055	0.02724	0.03210	0.35776	0.00000	0.00000	0.08660	0.08660	0.00000	0.02029	0.02029	—	85.5524	85.5524	0.00133	0.00331	86.6988
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00558	0.00497	0.00586	0.06529	0.00000	0.00000	0.01581	0.01581	0.00000	0.00370	0.00370	—	14.1642	14.1642	0.00022	0.00055	14.3540
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	—	1.93191	1.77736	—	1.77736	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
Dust From Material Movement	—	—	—	—	—	—	8.90702	8.90702	—	4.07393	4.07393	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	6.21863	5.22538	45.8339	47.6108	0.09562	1.93191	—	1.93191	1.77736	—	1.77736	—	10,356.4	10,356.4	0.42010	0.08402	10,391.9
Dust From Material Movement	—	—	—	—	—	—	8.90702	8.90702	—	4.07393	4.07393	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.27780	1.07371	9.41792	9.78304	0.01965	0.39697	—	0.39697	0.36521	—	0.36521	—	2,128.02	2,128.02	0.08632	0.01726	2,135.33
Dust From Material Movement	—	—	—	—	—	—	1.83021	1.83021	—	0.83711	0.83711	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23320	0.19595	1.71877	1.78541	0.00359	0.07245	—	0.07245	0.06665	—	0.06665	—	352.318	352.318	0.01429	0.00286	353.528

Dust From Material Movement	—	—	—	—	—	—	0.33401	0.33401	—	0.15277	0.15277	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.16300	0.14760	0.12825	2.31789	0.00000	0.00000	0.42481	0.42481	0.00000	0.09957	0.09957	—	456.670	456.670	0.00502	0.01540	462.807
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14867	0.13255	0.14294	1.55588	0.00000	0.00000	0.42481	0.42481	0.00000	0.09957	0.09957	—	404.468	404.468	0.00645	0.01612	409.471
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03055	0.02724	0.03210	0.35776	0.00000	0.00000	0.08660	0.08660	0.00000	0.02029	0.02029	—	85.5524	85.5524	0.00133	0.00331	86.6988
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00558	0.00497	0.00586	0.06529	0.00000	0.00000	0.01581	0.01581	0.00000	0.00370	0.00370	—	14.1642	14.1642	0.00022	0.00055	14.3540
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.4. Building Construction- P1 (2027)

3.4.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.36194	1.13580	9.95351	12.3832	0.02377	0.34395	—	0.34395	0.31643	—	0.31643	—	2,301.92	2,301.92	0.09338	0.01868	2,309.82
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.36194	1.13580	9.95351	12.3832	0.02377	0.34395	—	0.34395	0.31643	—	0.31643	—	2,301.92	2,301.92	0.09338	0.01868	2,309.82
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.59168	0.49344	4.32422	5.37980	0.01033	0.14942	—	0.14942	0.13747	—	0.13747	—	1,000.05	1,000.05	0.04057	0.00811	1,003.48
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10798	0.09005	0.78917	0.98181	0.00188	0.02727	—	0.02727	0.02509	—	0.02509	—	165.570	165.570	0.00672	0.00134	166.138
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05778	0.05232	0.04546	0.82160	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	161.872	161.872	0.00178	0.00546	164.047
Vendor	0.00456	0.00333	0.10321	0.04297	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	104.503	104.503	0.00023	0.01376	108.849
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05270	0.04698	0.05067	0.55150	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	143.369	143.369	0.00229	0.00571	145.142
Vendor	0.00410	0.00296	0.10886	0.04463	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	104.621	104.621	0.00023	0.01383	108.754
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02289	0.02041	0.02405	0.26812	0.00000	0.00000	0.06490	0.06490	0.00000	0.01521	0.01521	—	64.1158	64.1158	0.00099	0.00248	64.9750
Vendor	0.00185	0.00135	0.04730	0.01913	0.00037	0.00067	0.01263	0.01330	0.00067	0.00349	0.00416	—	45.4221	45.4221	0.00010	0.00601	47.2604
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00418	0.00373	0.00439	0.04893	0.00000	0.00000	0.01185	0.01185	0.00000	0.00278	0.00278	—	10.6151	10.6151	0.00016	0.00041	10.7573
Vendor	0.00034	0.00025	0.00863	0.00349	0.00007	0.00012	0.00231	0.00243	0.00012	0.00064	0.00076	—	7.52015	7.52015	0.00002	0.00099	7.82450
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.36194	1.13580	9.95351	12.3832	0.02377	0.34395	—	0.34395	0.31643	—	0.31643	—	2,301.92	2,301.92	0.09338	0.01868	2,309.82

Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.36194	1.13580	9.95351	12.3832	0.02377	0.34395	—	0.34395	0.31643	—	0.31643	—	2,301.92	2,301.92	0.09338	0.01868	2,309.82
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.59168	0.49344	4.32422	5.37980	0.01033	0.14942	—	0.14942	0.13747	—	0.13747	—	1,000.05	1,000.05	0.04057	0.00811	1,003.48
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10798	0.09005	0.78917	0.98181	0.00188	0.02727	—	0.02727	0.02509	—	0.02509	—	165.570	165.570	0.00672	0.00134	166.138
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05778	0.05232	0.04546	0.82160	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	161.872	161.872	0.00178	0.00546	164.047
Vendor	0.00456	0.00333	0.10321	0.04297	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	104.503	104.503	0.00023	0.01376	108.849
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.05270	0.04698	0.05067	0.55150	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	143.369	143.369	0.00229	0.00571	145.142
Vendor	0.00410	0.00296	0.10886	0.04463	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	104.621	104.621	0.00023	0.01383	108.754
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02289	0.02041	0.02405	0.26812	0.00000	0.00000	0.06490	0.06490	0.00000	0.01521	0.01521	—	64.1158	64.1158	0.00099	0.00248	64.9750
Vendor	0.00185	0.00135	0.04730	0.01913	0.00037	0.00067	0.01263	0.01330	0.00067	0.00349	0.00416	—	45.4221	45.4221	0.00010	0.00601	47.2604
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00418	0.00373	0.00439	0.04893	0.00000	0.00000	0.01185	0.01185	0.00000	0.00278	0.00278	—	10.6151	10.6151	0.00016	0.00041	10.7573
Vendor	0.00034	0.00025	0.00863	0.00349	0.00007	0.00012	0.00231	0.00243	0.00012	0.00064	0.00076	—	7.52015	7.52015	0.00002	0.00099	7.82450
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.5. Building Construction- P1 (2028)

3.5.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.31100	1.09333	9.51231	12.3653	0.02378	0.30878	—	0.30878	0.28408	—	0.28408	—	2,302.34	2,302.34	0.09339	0.01868	2,310.24
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.31100	1.09333	9.51231	12.3653	0.02378	0.30878	—	0.30878	0.28408	—	0.28408	—	2,302.34	2,302.34	0.09339	0.01868	2,310.24
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.93899	0.78309	6.81312	8.85658	0.01703	0.22116	—	0.22116	0.20347	—	0.20347	—	1,649.03	1,649.03	0.06689	0.01338	1,654.69
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17137	0.14291	1.24340	1.61633	0.00311	0.04036	—	0.04036	0.03713	—	0.03713	—	273.016	273.016	0.01107	0.00221	273.953
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05600	0.05054	0.04025	0.76433	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	158.799	158.799	0.00178	0.00546	160.925
Vendor	0.00440	0.00326	0.09976	0.04113	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	101.803	101.803	0.00023	0.01376	106.122
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04597	0.04495	0.04546	0.51201	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	140.679	140.679	0.00203	0.00546	142.369
Vendor	0.00403	0.00296	0.10540	0.04187	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	101.921	101.921	0.00023	0.01376	106.031
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03329	0.03256	0.03611	0.41002	0.00000	0.00000	0.10700	0.10700	0.00000	0.02507	0.02507	—	103.717	103.717	0.00146	0.00391	105.060
Vendor	0.00305	0.00223	0.07502	0.02956	0.00060	0.00110	0.02082	0.02193	0.00110	0.00576	0.00686	—	72.9515	72.9515	0.00016	0.00985	75.9575
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00608	0.00594	0.00659	0.07483	0.00000	0.00000	0.01953	0.01953	0.00000	0.00458	0.00458	—	17.1716	17.1716	0.00024	0.00065	17.3938
Vendor	0.00056	0.00041	0.01369	0.00539	0.00011	0.00020	0.00380	0.00400	0.00020	0.00105	0.00125	—	12.0780	12.0780	0.00003	0.00163	12.5756
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.31100	1.09333	9.51231	12.3653	0.02378	0.30878	—	0.30878	0.28408	—	0.28408	—	2,302.34	2,302.34	0.09339	0.01868	2,310.24
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.31100	1.09333	9.51231	12.3653	0.02378	0.30878	—	0.30878	0.28408	—	0.28408	—	2,302.34	2,302.34	0.09339	0.01868	2,310.24
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.93899	0.78309	6.81312	8.85658	0.01703	0.22116	—	0.22116	0.20347	—	0.20347	—	1,649.03	1,649.03	0.06689	0.01338	1,654.69
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17137	0.14291	1.24340	1.61633	0.00311	0.04036	—	0.04036	0.03713	—	0.03713	—	273.016	273.016	0.01107	0.00221	273.953
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05600	0.05054	0.04025	0.76433	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	158.799	158.799	0.00178	0.00546	160.925
Vendor	0.00440	0.00326	0.09976	0.04113	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	101.803	101.803	0.00023	0.01376	106.122
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04597	0.04495	0.04546	0.51201	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	140.679	140.679	0.00203	0.00546	142.369
Vendor	0.00403	0.00296	0.10540	0.04187	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	101.921	101.921	0.00023	0.01376	106.031
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03329	0.03256	0.03611	0.41002	0.00000	0.00000	0.10700	0.10700	0.00000	0.02507	0.02507	—	103.717	103.717	0.00146	0.00391	105.060
Vendor	0.00305	0.00223	0.07502	0.02956	0.00060	0.00110	0.02082	0.02193	0.00110	0.00576	0.00686	—	72.9515	72.9515	0.00016	0.00985	75.9575
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00608	0.00594	0.00659	0.07483	0.00000	0.00000	0.01953	0.01953	0.00000	0.00458	0.00458	—	17.1716	17.1716	0.00024	0.00065	17.3938
Vendor	0.00056	0.00041	0.01369	0.00539	0.00011	0.00020	0.00380	0.00400	0.00020	0.00105	0.00125	—	12.0780	12.0780	0.00003	0.00163	12.5756
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.6. Building Construction- P1 (2029)

3.6.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.27359	1.06216	9.18776	12.3175	0.02377	0.28463	—	0.28463	0.26186	—	0.26186	—	2,301.84	2,301.84	0.09337	0.01867	2,309.74
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21185	0.17668	1.52830	2.04889	0.00395	0.04735	—	0.04735	0.04356	—	0.04356	—	382.890	382.890	0.01553	0.00311	384.204
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03866	0.03224	0.27891	0.37392	0.00072	0.00864	—	0.00864	0.00795	—	0.00795	—	63.3918	63.3918	0.00257	0.00051	63.6093
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04368	0.03797	0.04025	0.47721	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	138.161	138.161	0.00203	0.00546	139.849
Vendor	0.00395	0.00288	0.10195	0.04072	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	99.0750	99.0750	0.00023	0.01299	102.956
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00735	0.00718	0.00752	0.08865	0.00000	0.00000	0.02485	0.02485	0.00000	0.00582	0.00582	—	23.6535	23.6535	0.00034	0.00091	23.9618
Vendor	0.00068	0.00050	0.01685	0.00667	0.00014	0.00026	0.00484	0.00509	0.00026	0.00134	0.00159	—	16.4690	16.4690	0.00004	0.00216	17.1271
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00134	0.00131	0.00137	0.01618	0.00000	0.00000	0.00454	0.00454	0.00000	0.00106	0.00106	—	3.91611	3.91611	0.00006	0.00015	3.96715
Vendor	0.00012	0.00009	0.00307	0.00122	0.00003	0.00005	0.00088	0.00093	0.00005	0.00024	0.00029	—	2.72663	2.72663	0.00001	0.00036	2.83558
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.27359	1.06216	9.18776	12.3175	0.02377	0.28463	—	0.28463	0.26186	—	0.26186	—	2,301.84	2,301.84	0.09337	0.01867	2,309.74
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21185	0.17668	1.52830	2.04889	0.00395	0.04735	—	0.04735	0.04356	—	0.04356	—	382.890	382.890	0.01553	0.00311	384.204
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03866	0.03224	0.27891	0.37392	0.00072	0.00864	—	0.00864	0.00795	—	0.00795	—	63.3918	63.3918	0.00257	0.00051	63.6093

Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04368	0.03797	0.04025	0.47721	0.00000	0.00000	0.15058	0.15058	0.00000	0.03530	0.03530	—	138.161	138.161	0.00203	0.00546	139.849
Vendor	0.00395	0.00288	0.10195	0.04072	0.00084	0.00154	0.02927	0.03081	0.00154	0.00809	0.00962	—	99.0750	99.0750	0.00023	0.01299	102.956
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00735	0.00718	0.00752	0.08865	0.00000	0.00000	0.02485	0.02485	0.00000	0.00582	0.00582	—	23.6535	23.6535	0.00034	0.00091	23.9618
Vendor	0.00068	0.00050	0.01685	0.00667	0.00014	0.00026	0.00484	0.00509	0.00026	0.00134	0.00159	—	16.4690	16.4690	0.00004	0.00216	17.1271
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00134	0.00131	0.00137	0.01618	0.00000	0.00000	0.00454	0.00454	0.00000	0.00106	0.00106	—	3.91611	3.91611	0.00006	0.00015	3.96715
Vendor	0.00012	0.00009	0.00307	0.00122	0.00003	0.00005	0.00088	0.00093	0.00005	0.00024	0.00029	—	2.72663	2.72663	0.00001	0.00036	2.83558
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.7. Paving (2028)

3.7.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66135	0.55572	5.22455	7.84873	0.01104	0.19229	—	0.19229	0.17690	—	0.17690	—	1,195.49	1,195.49	0.04849	0.00970	1,199.59
Paving	2.21692	2.21692	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66135	0.55572	5.22455	7.84873	0.01104	0.19229	—	0.19229	0.17690	—	0.17690	—	1,195.49	1,195.49	0.04849	0.00970	1,199.59
Paving	2.21692	2.21692	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02355	0.01979	0.18608	0.27954	0.00039	0.00685	—	0.00685	0.00630	—	0.00630	—	42.5790	42.5790	0.00173	0.00035	42.7251
Paving	0.07896	0.07896	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00430	0.00361	0.03396	0.05102	0.00007	0.00125	—	0.00125	0.00115	—	0.00115	—	7.04944	7.04944	0.00029	0.00006	7.07363
Paving	0.01441	0.01441	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.7.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06076	0.05484	0.04368	0.82935	0.00000	0.00000	0.16339	0.16339	0.00000	0.03830	0.03830	—	172.308	172.308	0.00193	0.00592	174.614
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04988	0.04878	0.04933	0.55556	0.00000	0.00000	0.16339	0.16339	0.00000	0.03830	0.03830	—	152.647	152.647	0.00220	0.00592	154.480
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00180	0.00176	0.00195	0.02212	0.00000	0.00000	0.00577	0.00577	0.00000	0.00135	0.00135	—	5.59627	5.59627	0.00008	0.00021	5.66870
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00033	0.00032	0.00036	0.00404	0.00000	0.00000	0.00105	0.00105	0.00000	0.00025	0.00025	—	0.92653	0.92653	0.00001	0.00003	0.93852
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.7.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66135	0.55572	5.22455	7.84873	0.01104	0.19229	—	0.19229	0.17690	—	0.17690	—	1,195.49	1,195.49	0.04849	0.00970	1,199.59
Paving	2.21692	2.21692	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66135	0.55572	5.22455	7.84873	0.01104	0.19229	—	0.19229	0.17690	—	0.17690	—	1,195.49	1,195.49	0.04849	0.00970	1,199.59
Paving	2.21692	2.21692	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02355	0.01979	0.18608	0.27954	0.00039	0.00685	—	0.00685	0.00630	—	0.00630	—	42.5790	42.5790	0.00173	0.00035	42.7251
Paving	0.07896	0.07896	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00430	0.00361	0.03396	0.05102	0.00007	0.00125	—	0.00125	0.00115	—	0.00115	—	7.04944	7.04944	0.00029	0.00006	7.07363
Paving	0.01441	0.01441	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.7.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06076	0.05484	0.04368	0.82935	0.00000	0.00000	0.16339	0.16339	0.00000	0.03830	0.03830	—	172.308	172.308	0.00193	0.00592	174.614
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04988	0.04878	0.04933	0.55556	0.00000	0.00000	0.16339	0.16339	0.00000	0.03830	0.03830	—	152.647	152.647	0.00220	0.00592	154.480
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00180	0.00176	0.00195	0.02212	0.00000	0.00000	0.00577	0.00577	0.00000	0.00135	0.00135	—	5.59627	5.59627	0.00008	0.00021	5.66870
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00033	0.00032	0.00036	0.00404	0.00000	0.00000	0.00105	0.00105	0.00000	0.00025	0.00025	—	0.92653	0.92653	0.00001	0.00003	0.93852
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.8. Architectural Coating-1 (2028)

3.8.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25969	0.21462	1.61628	2.23666	0.00345	0.03071	—	0.03071	0.02826	—	0.02826	—	267.034	267.034	0.01083	0.00217	267.950
Architectural Coatings	20.6910	20.6910	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00783	0.00647	0.04871	0.06741	0.00010	0.00093	—	0.00093	0.00085	—	0.00085	—	8.04760	8.04760	0.00033	0.00007	8.07522
Architectural Coatings	0.62356	0.62356	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00143	0.00118	0.00889	0.01230	0.00002	0.00017	—	0.00017	0.00016	—	0.00016	—	1.33237	1.33237	0.00005	0.00001	1.33694
Architectural Coatings	0.11380	0.11380	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.8.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01120	0.01011	0.00805	0.15287	0.00000	0.00000	0.03012	0.03012	0.00000	0.00706	0.00706	—	31.7599	31.7599	0.00036	0.00109	32.1849
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00028	0.00027	0.00030	0.00345	0.00000	0.00000	0.00090	0.00090	0.00000	0.00021	0.00021	—	0.87281	0.87281	0.00001	0.00003	0.88411
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00005	0.00005	0.00006	0.00063	0.00000	0.00000	0.00016	0.00016	0.00000	0.00004	0.00004	—	0.14450	0.14450	< 0.000005	0.00001	0.14637
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.8.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25969	0.21462	1.61628	2.23666	0.00345	0.03071	—	0.03071	0.02826	—	0.02826	—	267.034	267.034	0.01083	0.00217	267.950
Architectural Coatings	20.6910	20.6910	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00783	0.00647	0.04871	0.06741	0.00010	0.00093	—	0.00093	0.00085	—	0.00085	—	8.04760	8.04760	0.00033	0.00007	8.07522

Architectural Coatings	0.62356	0.62356	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00143	0.00118	0.00889	0.01230	0.00002	0.00017	—	0.00017	0.00016	—	0.00016	—	1.33237	1.33237	0.00005	0.00001	1.33694
Architectural Coatings	0.11380	0.11380	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.8.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01120	0.01011	0.00805	0.15287	0.00000	0.00000	0.03012	0.03012	0.00000	0.00706	0.00706	—	31.7599	31.7599	0.00036	0.00109	32.1849
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00028	0.00027	0.00030	0.00345	0.00000	0.00000	0.00090	0.00090	0.00000	0.00021	0.00021	—	0.87281	0.87281	0.00001	0.00003	0.88411
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.00005	0.00005	0.00006	0.00063	0.00000	0.00000	0.00016	0.00016	0.00000	0.00004	0.00004	—	0.14450	0.14450	< 0.000005	0.00001	0.14637
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.9. Architectural Coating-2 (2028)

3.9.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25969	0.21462	1.61628	2.23666	0.00345	0.03071	—	0.03071	0.02826	—	0.02826	—	267.034	267.034	0.01083	0.00217	267.950
Architectural Coatings	17.8829	17.8829	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25969	0.21462	1.61628	2.23666	0.00345	0.03071	—	0.03071	0.02826	—	0.02826	—	267.034	267.034	0.01083	0.00217	267.950
Architectural Coatings	17.8829	17.8829	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00711	0.00588	0.04428	0.06128	0.00009	0.00084	—	0.00084	0.00077	—	0.00077	—	7.31600	7.31600	0.00030	0.00006	7.34111

Architect Coatings	0.48994	0.48994	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00130	0.00107	0.00808	0.01118	0.00002	0.00015	—	0.00015	0.00014	—	0.00014	—	1.21125	1.21125	0.00005	0.00001	1.21540
Architectural Coatings	0.08941	0.08941	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.9.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.9.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25969	0.21462	1.61628	2.23666	0.00345	0.03071	—	0.03071	0.02826	—	0.02826	—	267.034	267.034	0.01083	0.00217	267.950
Architectural Coatings	17.8829	17.8829	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25969	0.21462	1.61628	2.23666	0.00345	0.03071	—	0.03071	0.02826	—	0.02826	—	267.034	267.034	0.01083	0.00217	267.950
Architectural Coatings	17.8829	17.8829	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00711	0.00588	0.04428	0.06128	0.00009	0.00084	—	0.00084	0.00077	—	0.00077	—	7.31600	7.31600	0.00030	0.00006	7.34111

Architect Coatings	0.48994	0.48994	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00130	0.00107	0.00808	0.01118	0.00002	0.00015	—	0.00015	0.00014	—	0.00014	—	1.21125	1.21125	0.00005	0.00001	1.21540
Architectural Coatings	0.08941	0.08941	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.9.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.10. Architectural Coating-3 (2029)

3.10.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24770	0.20471	1.58831	2.22431	0.00345	0.02568	—	0.02568	0.02363	—	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Architectural Coatings	21.1344	21.1344	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24770	0.20471	1.58831	2.22431	0.00345	0.02568	—	0.02568	0.02363	—	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Architectural Coatings	21.1344	21.1344	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.00679	0.00561	0.04352	0.06094	0.00009	0.00070	—	0.00070	0.00065	—	0.00065	—	7.31560	7.31560	0.00030	0.00006	7.34070
Architectural Coatings	0.57902	0.57902	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00124	0.00102	0.00794	0.01112	0.00002	0.00013	—	0.00013	0.00012	—	0.00012	—	1.21118	1.21118	0.00005	0.00001	1.21534
Architectural Coatings	0.10567	0.10567	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.10.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.10.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24770	0.20471	1.58831	2.22431	0.00345	0.02568	—	0.02568	0.02363	—	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Architectural Coatings	21.1344	21.1344	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24770	0.20471	1.58831	2.22431	0.00345	0.02568	—	0.02568	0.02363	—	0.02363	—	267.019	267.019	0.01083	0.00217	267.936
Architectural Coatings	21.1344	21.1344	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.00679	0.00561	0.04352	0.06094	0.00009	0.00070	—	0.00070	0.00065	—	0.00065	—	7.31560	7.31560	0.00030	0.00006	7.34070
Architectural Coatings	0.57902	0.57902	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00124	0.00102	0.00794	0.01112	0.00002	0.00013	—	0.00013	0.00012	—	0.00012	—	1.21118	1.21118	0.00005	0.00001	1.21534
Architectural Coatings	0.10567	0.10567	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

3.10.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.50357	1.38156	1.45973	14.3764	0.03781	0.02725	3.40390	3.43116	0.02566	0.86246	0.88812	—	3,849.21	3,849.21	0.10673	0.15082	3,906.82
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	1.50357	1.38156	1.45973	14.3764	0.03781	0.02725	3.40390	3.43116	0.02566	0.86246	0.88812	—	3,849.21	3,849.21	0.10673	0.15082	3,906.82
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.36139	1.24052	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	—	3,509.71	3,509.71	0.10992	0.15605	3,559.22

Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	1.36139	1.24052	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	—	3,509.71	3,509.71	0.10992	0.15605	3,559.22
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.24443	0.22265	0.28810	2.11437	0.00628	0.00486	0.60258	0.60745	0.00458	0.15270	0.15727	—	580.610	580.610	0.01802	0.02563	589.397
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.24443	0.22265	0.28810	2.11437	0.00628	0.00486	0.60258	0.60745	0.00458	0.15270	0.15727	—	580.610	580.610	0.01802	0.02563	589.397

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.50357	1.38156	1.45973	14.3764	0.03781	0.02725	3.40390	3.43116	0.02566	0.86246	0.88812	—	3,849.21	3,849.21	0.10673	0.15082	3,906.82
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	1.50357	1.38156	1.45973	14.3764	0.03781	0.02725	3.40390	3.43116	0.02566	0.86246	0.88812	—	3,849.21	3,849.21	0.10673	0.15082	3,906.82
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.36139	1.24052	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	—	3,509.71	3,509.71	0.10992	0.15605	3,559.22

Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	1.36139	1.24052	1.57563	10.9251	0.03445	0.02726	3.40390	3.43117	0.02567	0.86246	0.88813	—	3,509.71	3,509.71	0.10992	0.15605	3,559.22
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.24443	0.22265	0.28810	2.11437	0.00628	0.00486	0.60258	0.60745	0.00458	0.15270	0.15727	—	580.610	580.610	0.01802	0.02563	589.397
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.24443	0.22265	0.28810	2.11437	0.00628	0.00486	0.60258	0.60745	0.00458	0.15270	0.15727	—	580.610	580.610	0.01802	0.02563	589.397

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	354.910	354.910	0.02202	0.00267	356.255
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	354.910	354.910	0.02202	0.00267	356.255
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	354.910	354.910	0.02202	0.00267	356.255

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	354.910	354.910	0.02202	0.00267	356.255
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	58.7594	58.7594	0.00364	0.00044	58.9821
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	58.7594	58.7594	0.00364	0.00044	58.9821

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	359.547	359.547	0.02230	0.00270	360.910
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	359.547	359.547	0.02230	0.00270	360.910
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	359.547	359.547	0.02230	0.00270	360.910

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	359.547	359.547	0.02230	0.00270	360.910
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	59.5271	59.5271	0.00369	0.00045	59.7528
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	59.5271	59.5271	0.00369	0.00045	59.7528

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	320.893	320.893	0.02840	0.00060	321.783
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	320.893	320.893	0.02840	0.00060	321.783
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	320.893	320.893	0.02840	0.00060	321.783

Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.02958	0.01479	0.25281	0.10758	0.00161	0.02044	—	0.02044	0.02044	—	0.02044	—	320.893	320.893	0.02840	0.00060	321.783
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.00540	0.00270	0.04614	0.01963	0.00029	0.00373	—	0.00373	0.00373	—	0.00373	—	53.1274	53.1274	0.00470	0.00010	53.2748
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00540	0.00270	0.04614	0.01963	0.00029	0.00373	—	0.00373	0.00373	—	0.00373	—	53.1274	53.1274	0.00470	0.00010	53.2748

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	1.69415	1.69415	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.16925	0.16925	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.16635	0.15750	0.01706	1.82028	0.00008	0.00084	—	0.00084	0.00063	—	0.00063	—	4.85399	4.85399	0.00020	0.00004	4.87107
Total	2.02975	2.02091	0.01706	1.82028	0.00008	0.00084	—	0.00084	0.00063	—	0.00063	—	4.85399	4.85399	0.00020	0.00004	4.87107
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consum Products	1.69415	1.69415	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.16925	0.16925	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	1.86341	1.86341	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.30918	0.30918	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03089	0.03089	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01497	0.01417	0.00154	0.16383	0.00001	0.00008	—	0.00008	0.00006	—	0.00006	—	0.39631	0.39631	0.00002	< 0.000005	0.39771
Total	0.35504	0.35425	0.00154	0.16383	0.00001	0.00008	—	0.00008	0.00006	—	0.00006	—	0.39631	0.39631	0.00002	< 0.000005	0.39771

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	1.57030	1.57030	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.16925	0.16925	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.16635	0.15750	0.01706	1.82028	0.00008	0.00084	—	0.00084	0.00063	—	0.00063	—	4.85399	4.85399	0.00020	0.00004	4.87107

Total	1.90591	1.89706	0.01706	1.82028	0.00008	0.00084	—	0.00084	0.00063	—	0.00063	—	4.85399	4.85399	0.00020	0.00004	4.87107
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	1.57030	1.57030	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.16925	0.16925	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	1.73956	1.73956	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.28658	0.28658	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.03089	0.03089	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01497	0.01417	0.00154	0.16383	0.00001	0.00008	—	0.00008	0.00006	—	0.00006	—	0.39631	0.39631	0.00002	< 0.000005	0.39771
Total	0.33244	0.33164	0.00154	0.16383	0.00001	0.00008	—	0.00008	0.00006	—	0.00006	—	0.39631	0.39631	0.00002	< 0.000005	0.39771

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	0.42315	1.85320	2.27635	0.04350	0.00104	3.67533
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	0.42315	1.85320	2.27635	0.04350	0.00104	3.67533

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.55587	11.1934	13.7493	0.26277	0.00631	22.1992
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	0.42315	1.85320	2.27635	0.04350	0.00104	3.67533
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	0.42315	1.85320	2.27635	0.04350	0.00104	3.67533

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.03204	0.00000	2.03204	0.20310	0.00000	7.10942
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.03204	0.00000	2.03204	0.20310	0.00000	7.10942

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	12.2736	0.00000	12.2736	1.22671	0.00000	42.9413
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2.03204	0.00000	2.03204	0.20310	0.00000	7.10942
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.03204	0.00000	2.03204	0.20310	0.00000	7.10942

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	1/4/2027	1/13/2027	5.00000	8.00000	—
Site Preparation	Site Preparation	1/14/2027	1/28/2027	5.00000	11.0000	—
Grading	Grading	2/1/2027	5/14/2027	5.00000	75.0000	—

Building Construction- P1	Building Construction	5/24/2027	3/26/2029	5.00000	481.000	—
Paving	Paving	3/22/2028	4/7/2028	5.00000	13.0000	—
Architectural Coating-1	Architectural Coating	4/10/2028	4/24/2028	5.00000	11.0000	Phase 1
Architectural Coating-2	Architectural Coating	9/25/2028	10/6/2028	5.00000	10.00000	Phase2
Architectural Coating-3	Architectural Coating	3/27/2029	4/9/2029	5.00000	10.00000	Phase 3

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	2.00000	8.00000	33.0000	0.73000
Demolition	Excavators	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Demolition	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	8.00000	84.0000	0.37000
Grading	Excavators	Diesel	Average	3.00000	8.00000	36.0000	0.38000
Grading	Graders	Diesel	Average	2.00000	8.00000	148.000	0.41000
Grading	Rubber Tired Dozers	Diesel	Average	3.00000	8.00000	367.000	0.40000
Grading	Scrapers	Diesel	Average	2.00000	8.00000	423.000	0.48000
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	8.00000	84.0000	0.37000
Building Construction-P1	Cranes	Diesel	Average	1.000000	7.00000	367.000	0.29000
Building Construction-P1	Forklifts	Diesel	Average	2.00000	8.00000	82.0000	0.20000
Building Construction-P1	Generator Sets	Diesel	Average	2.00000	8.00000	14.0000	0.74000
Building Construction-P1	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	7.00000	84.0000	0.37000

Building Construction-P1	Welders	Diesel	Average	2.00000	8.00000	46.0000	0.45000
Paving	Pavers	Diesel	Average	1.000000	8.00000	81.0000	0.42000
Paving	Paving Equipment	Diesel	Average	2.00000	8.00000	89.0000	0.36000
Paving	Rollers	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Architectural Coating-1	Air Compressors	Diesel	Average	2.00000	6.00000	37.0000	0.48000
Architectural Coating-2	Air Compressors	Diesel	Average	2.00000	6.00000	37.0000	0.48000
Architectural Coating-3	Air Compressors	Diesel	Average	2.00000	6.00000	37.0000	0.48000

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	2.00000	8.00000	33.0000	0.73000
Demolition	Excavators	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Demolition	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	8.00000	84.0000	0.37000
Grading	Excavators	Diesel	Average	3.00000	8.00000	36.0000	0.38000
Grading	Graders	Diesel	Average	2.00000	8.00000	148.000	0.41000
Grading	Rubber Tired Dozers	Diesel	Average	3.00000	8.00000	367.000	0.40000
Grading	Scrapers	Diesel	Average	2.00000	8.00000	423.000	0.48000
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	8.00000	84.0000	0.37000
Building Construction-P1	Cranes	Diesel	Average	1.000000	7.00000	367.000	0.29000
Building Construction-P1	Forklifts	Diesel	Average	2.00000	8.00000	82.0000	0.20000

Building Construction-P1	Generator Sets	Diesel	Average	2.00000	8.00000	14.0000	0.74000
Building Construction-P1	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	7.00000	84.0000	0.37000
Building Construction-P1	Welders	Diesel	Average	2.00000	8.00000	46.0000	0.45000
Paving	Pavers	Diesel	Average	1.000000	8.00000	81.0000	0.42000
Paving	Paving Equipment	Diesel	Average	2.00000	8.00000	89.0000	0.36000
Paving	Rollers	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Architectural Coating-1	Air Compressors	Diesel	Average	2.00000	6.00000	37.0000	0.48000
Architectural Coating-2	Air Compressors	Diesel	Average	2.00000	6.00000	37.0000	0.48000
Architectural Coating-3	Air Compressors	Diesel	Average	2.00000	6.00000	37.0000	0.48000

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	Worker	15.0000	18.5000	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2000	HHDT,MHDT
Demolition	Hauling	0.00000	20.0000	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	Worker	10.00000	18.5000	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2000	HHDT,MHDT
Site Preparation	Hauling	0.00000	20.0000	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	Worker	32.5000	18.5000	LDA,LDT1,LDT2
Grading	Vendor	—	10.2000	HHDT,MHDT

Grading	Hauling	0.00000	20.0000	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction- P1	Worker	11.5200	18.5000	LDA,LDT1,LDT2
Building Construction- P1	Vendor	3.42080	10.2000	HHDT,MHDT
Building Construction- P1	Hauling	0.00000	20.0000	HHDT
Building Construction- P1	Onsite truck	—	—	HHDT
Paving	Worker	12.5000	18.5000	LDA,LDT1,LDT2
Paving	Vendor	—	10.2000	HHDT,MHDT
Paving	Hauling	0.00000	20.0000	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating-1	Worker	2.30400	18.5000	LDA,LDT1,LDT2
Architectural Coating-1	Vendor	—	10.2000	HHDT,MHDT
Architectural Coating-1	Hauling	0.00000	20.0000	HHDT
Architectural Coating-1	Onsite truck	—	—	HHDT
Architectural Coating-2	Worker	—	18.5000	LDA,LDT1,LDT2
Architectural Coating-2	Vendor	—	10.2000	HHDT,MHDT
Architectural Coating-2	Hauling	0.00000	20.0000	HHDT
Architectural Coating-2	Onsite truck	—	—	HHDT
Architectural Coating-3	Worker	—	18.5000	LDA,LDT1,LDT2
Architectural Coating-3	Vendor	—	10.2000	HHDT,MHDT
Architectural Coating-3	Hauling	0.00000	20.0000	HHDT
Architectural Coating-3	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	Worker	15.0000	18.5000	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2000	HHDT,MHDT
Demolition	Hauling	0.00000	20.0000	HHDT

Demolition	Onsite truck	—	—	HHDT
Site Preparation	Worker	10.00000	18.5000	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2000	HHDT,MHDT
Site Preparation	Hauling	0.00000	20.0000	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	Worker	32.5000	18.5000	LDA,LDT1,LDT2
Grading	Vendor	—	10.2000	HHDT,MHDT
Grading	Hauling	0.00000	20.0000	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction- P1	Worker	11.5200	18.5000	LDA,LDT1,LDT2
Building Construction- P1	Vendor	3.42080	10.2000	HHDT,MHDT
Building Construction- P1	Hauling	0.00000	20.0000	HHDT
Building Construction- P1	Onsite truck	—	—	HHDT
Paving	Worker	12.5000	18.5000	LDA,LDT1,LDT2
Paving	Vendor	—	10.2000	HHDT,MHDT
Paving	Hauling	0.00000	20.0000	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating-1	Worker	2.30400	18.5000	LDA,LDT1,LDT2
Architectural Coating-1	Vendor	—	10.2000	HHDT,MHDT
Architectural Coating-1	Hauling	0.00000	20.0000	HHDT
Architectural Coating-1	Onsite truck	—	—	HHDT
Architectural Coating-2	Worker	—	18.5000	LDA,LDT1,LDT2
Architectural Coating-2	Vendor	—	10.2000	HHDT,MHDT
Architectural Coating-2	Hauling	0.00000	20.0000	HHDT
Architectural Coating-2	Onsite truck	—	—	HHDT
Architectural Coating-3	Worker	—	18.5000	LDA,LDT1,LDT2
Architectural Coating-3	Vendor	—	10.2000	HHDT,MHDT
Architectural Coating-3	Hauling	0.00000	20.0000	HHDT

Architectural Coating-3	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating-1	57,748.2	19,249.4	0.00000	0.00000	10,592.0
Architectural Coating-2	45,373.6	15,124.5	0.00000	0.00000	8,322.25
Architectural Coating-3	53,623.3	17,874.4	0.00000	0.00000	9,835.39

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Demolition	0.00000	0.00000	0.00000	—	0.00000
Site Preparation	0.00000	0.00000	11.0000	0.00000	0.00000
Grading	0.00000	0.00000	70.2000	0.00000	0.00000
Paving	0.00000	0.00000	0.00000	0.00000	11.3526

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Phase Name	Land Use	Area Paved (acres)	% Asphalt
Paving	Single Family Housing	0.35262	0%
Paving	Other Asphalt Surfaces	11.0000	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2027	0.00000	531.983	0.03300	0.00400
2028	0.00000	531.983	0.03300	0.00400
2029	0.00000	531.983	0.03300	0.00400

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	302.080	305.280	273.600	108,941	4,775.84	4,826.43	4,325.58	1,722,342
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year

Single Family Housing	302.080	305.280	273.600	108,941	4,775.84	4,826.43	4,325.58	1,722,342
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	243,508	531.983	0.0330	0.0040	1,001,271
Other Asphalt Surfaces	0.00000	531.983	0.0330	0.0040	0.00000

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	246,689	531.983	0.0330	0.0040	0.00000
Other Asphalt Surfaces	0.00000	531.983	0.0330	0.0040	0.00000

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	1,333,798	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)

Single Family Housing	1,333,798	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	22.7737	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	22.7737	0.00000
Other Asphalt Surfaces	0.00000	0.00000

8. User Changes to Default Data

8.1. Justifications

Screen	Justification
Land Use	Project acreage is 81.2 gross and 70.2 net with 11 acres dedicated to rights-of-way. Land Use is a residential subdivision and the construction and operation of 32 single-family residential homes. Based on 2019-2024 Census data for the Joshua Tree Census Designated Place, a persons per household of 2.42 resulting in a population of 78 persons. Assumes electric usage and not gas for appliances and heating.
Construction: Construction Phases	Applicant provided estimates
Construction: Off-Road Equipment	Applicant provided estimates.
Construction: Dust From Material Movement	Engineer provided estimates
Operations: Hearths	Assumes housing will have no fireplaces or woodstoves.

8.3. Land Use

Model Parameter	Units	Default Value	New Value
Lot Area	acre	10.3896	70.2000
Building Area	sq. ft	62,400.0	77,405.0
Landscape Area	sq. ft	374,811	0.00000
Special Landscape Area	sq. ft	—	0.00000
Population	people	106.000	78.0000

8.4. Construction

8.4.1. Construction Phases

Phase Type	Phase Name	Model Parameter	Default Value	New Value
Demolition	Demolition	End Date	5/24/2027	1/13/2027
Demolition	Demolition	Work Days per Phase	100.0000	8.00000
Site Preparation	Site Preparation	Start Date	5/25/2027	1/14/2027
Site Preparation	Site Preparation	End Date	8/17/2027	1/28/2027
Site Preparation	Site Preparation	Work Days per Phase	60.0000	11.0000
Grading	Grading	Start Date	8/18/2027	2/1/2027
Grading	Grading	End Date	3/22/2028	5/14/2027
Grading	Grading	Work Days per Phase	155.000	75.0000
Paving	Paving	Start Date	3/3/2034	3/22/2028
Paving	Paving	End Date	8/4/2034	4/7/2028
Paving	Paving	Work Days per Phase	110.000	13.0000

8.4.2. Off-Road Equipment

Phase Name	Equipment Type	Model Parameter	Default Value	New Value
Demolition	Concrete/Industrial Saws	Number per Day	1.000000	2.00000

Demolition	Excavators	Number per Day	3.00000	2.00000
Site Preparation	Rubber Tired Dozers	Number per Day	3.00000	2.00000
Site Preparation	Tractors/Loaders/Backhoes	Number per Day	4.00000	2.00000
Grading	Excavators	Number per Day	2.00000	3.00000
Grading	Graders	Number per Day	1.000000	2.00000
Grading	Rubber Tired Dozers	Number per Day	1.000000	3.00000
Grading	Tractors/Loaders/Backhoes	Number per Day	2.00000	3.00000
Building Construction- P1	Forklifts	Number per Day	3.00000	2.00000
Building Construction- P1	Generator Sets	Number per Day	1.000000	2.00000
Building Construction- P1	Tractors/Loaders/Backhoes	Number per Day	3.00000	2.00000
Building Construction- P1	Welders	Number per Day	1.000000	2.00000
Paving	Pavers	Number per Day	2.00000	1.000000
Architectural Coating-1	Air Compressors	Number per Day	1.000000	2.00000
Architectural Coating-2	Air Compressors	Number per Day	1.000000	2.00000
Architectural Coating-3	Air Compressors	Number per Day	1.000000	2.00000

8.4.4. Dust from Material Movement

Phase Name	Model Parameter	Units	Default Value	New Value
Grading	Material Imported	Cubic Yards	—	0.00000
Grading	Material Exported	Cubic Yards	—	0.00000
Grading	Total Acres Graded	acres	337.500	70.2000

Those projects that do not garner 100 points using the Screening Tables will need to provide additional analysis to determine the significance of GHG emissions. Nothing in this guidance shall be construed as limiting the County's authority to adopt a statement of overriding consideration for projects that require the preparation of an EIR due to significant GHG impacts. The following tables provide a menu of performance standards/options related to GHG mitigation measures and design features that can be used to demonstrate consistency with the reduction measures and GHG reduction quantities in the forthcoming GHG Reduction Plan Update.

Table 1: Screening Table for Implementing GHG Performance Standards for Residential Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure Energy : Exceed Energy Efficiency Standards in New Residential Units			
Building Envelope			
Insulation	• 2019 Title 24 Requirements (walls R-8, roof/attic R-30) • Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38) • Greatly Enhanced Insulation (spray foam wall insulated walls R-18 or higher, roof/attic R-38 or higher)	4 points 9 points 11 points	11
Windows	• 2019 Title 24 Windows (0.3 U-factor, .0.23 solar heat gain coefficient [SHGC]) • Enhanced Window (0.28 U-Factor, 0.22 SHGC) • Greatly Enhanced Window (less than 0.28 U-Factor, less than 0.22 SHGC)	2 points 4 points 5 points	4
Cool Roofs	• Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance) • Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	6 points 7 points	6
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage. • Air barrier applied to exterior walls, caulking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent) • Blower Door HERS Verified Envelope Leakage or equivalent	6 points 5 points	5
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls. • Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials) • Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood, or other insulating materials)	1 point 2 points	1
Indoor Space Efficiencies			
Heating/ Cooling Distribution System	• Minimum Duct Insulation (R-6 required) • Enhanced Duct Insulation (R-8) • Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	2 points 4 points 5 points 7 points	5

Table 1: Screening Table for Implementing GHG Performance Standards for Residential Development

Feature	Description	Assigned Point Values	Project Points
Space Heating/ Cooling Equipment	• 2019 Title 24 Minimum HVAC Efficiency (SEER 13/75% AFUE or 7.7 HSPF) • Improved Efficiency HVAC (SEER 14/78% AFUE or 8 HSPF) • High Efficiency HVAC (SEER 15/80% AFUE or 8.5 HSPF) • Very High Efficiency HVAC (SEER 16/82% AFUE or 9 HSPF)	1 points 2 points 4 points 5 points	4
Water Heaters	• 2019 Title 24 Minimum Efficiency (0.57 Energy Factor) • Improved Efficiency Water Heater (0.675 Energy Factor) • High Efficiency Water Heater (0.72 Energy Factor) • Very High Efficiency Water Heater (0.92 Energy Factor) • Solar Pre-heat System (0.2 Net Solar Fraction) • Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	4 points 7 points 9 points 11 points 2 points 5 points	9
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. • All peripheral rooms within the living space have at least one window (required) • All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.) • All rooms daylighted	 0 points 1 point 1 point	1
Artificial Lighting	• Efficient Lights (25% of in-unit fixtures considered high efficiency. High efficiency is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) • High Efficiency Lights (50% of in-unit fixtures are high efficiency) • Very High Efficiency Lights (100% of in-unit fixtures are high efficiency)	5 points 6 points 7 points	7
Appliances	• Energy Star Refrigerator (new) • Energy Star Dishwasher (new) • Energy Star Washing Machine (new)	1 point 1 point 1 point	3
Miscellaneous Residential Building Efficiencies			
Building Placement	North/south alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	3 points	3
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on June 21st.	2 points	0
Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	15 points	15
Independent Energy Efficiency Calculations	Provide point values based upon energy efficiency modeling of the project. Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	/
Other	This allows innovation by the applicant to provide design features that increase the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	/

Table 1: Screening Table for Implementing GHG Performance Standards for Residential Development

Feature	Description	Assigned Point Values	Project Points
Existing Residential Retrofits	Having residential developments within walking and biking distances of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT). The suburban project will have at least three of the following on site and/or off site within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for daycare, banking/ATM, restaurants, vehicle refueling, and shopping.	TBD	✓
Reduction Measure Energy 3: All Electric Homes			
All-Electric Homes	All electric homes reduce GHG emissions, as the grid electricity they use is generated using less carbon over time. Grid electricity in California will be 60 percent renewable energy by 2030 and 100 percent renewable energy by 2040.	12 points	12
Reduction Measure Energy-7: Clean Energy			
Residential Renewable Energy Generation			
Photovoltaic	Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	9 points 12 points 17 points 20 points 23 points 25 points 28 points 31 points	9
Wind Turbines	Some areas of the County lend themselves to wind turbine applications. Analysis of the areas' capability to support wind turbines should be evaluated prior to choosing this feature. Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments: • 30 percent of the power needs of the project • 40 percent of the power needs of the project • 50 percent of the power needs of the project • 60 percent of the power needs of the project • 70 percent of the power needs of the project • 80 percent of the power needs of the project • 90 percent of the power needs of the project • 100 percent of the power needs of the project	9 points 12 points 17 points 21 points 23 points 25 points 28 points 31 points	
Off-site Renewable Energy Project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes. These off-site renewable energy retrofit project proposals will be determined on a case-by-case basis and shall be accompanied by a detailed plan that documents the quantity of renewable energy the proposal would generate. Point values will be determined based upon the energy generated by the proposal.	TBD	✓

Table 1: Screening Table for Implementing GHG Performance Standards for Residential Development

Feature	Description	Assigned Point Values	Project Points
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	/
Reduction Measure Water : Exceed Water Efficiency Standards			
Residential Irrigation and Landscaping			
Water Efficient Landscaping	• Limit conventional turf to < 25% of required landscape area • Limit conventional turf to < 50% of required landscape area • No conventional turf (warm season turf to < 50% of required landscape area and/or low water using plants are allowed) • Only California Native Plants that require no irrigation or some supplemental irrigation	0 points 2 points 4 points 5 points	5
Water Efficient Irrigation Systems	• Low precipitation spray heads < 0.75"/hr or drip irrigation • Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	1 point 2 points	1
Storm Water Reuse Systems	Innovative on-site storm water collection, filtration, and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	/
Residential Potable Water			
Showers	Water Efficient Showerheads (2.0 gpm)	2 points	2
Toilets	Water Efficient Toilets (1.5 gpm)	2 points	2
Faucets	Water Efficient Faucets (1.28 gpm)	2 points	2
Dishwasher	Water Efficient Dishwasher (6 gallons per cycle or less)	1 point	1
Washing Machine	Water Efficient Washing Machine (Water factor <5.5)	1 point	1
WaterSense	EPA WaterSense Certification	7 points	0
Increase Residential Reclaimed Water Use			
Recycled Water	5% of the total project's water use comes from recycled/reclaimed water	5 points	5
Reduction Measure On Road: Alternative Transportation Options			
Increase Residential Density			
Residential Density	Designing the project with increased densities, where allowed by the General Plan and/or Zoning Ordinance, reduces GHG emissions associated with traffic in several ways. Increased densities affect the distance people travel and provide greater options for the modes of travel they choose. This strategy also provides a foundation for implementation of many other strategies, which would benefit from increased densities. 1 point is allowed for each 10% increase in density beyond 7 units/acre, up to 500% (50 points)	1–50 points	0

Table 1: Screening Table for Implementing GHG Performance Standards for Residential Development

Feature	Description	Assigned Point Values	Project Points
Mixed-Use Development			
Mixed-Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed-use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges: • Diversity of land uses complementing each other (2–28 points) • Increased destination accessibility other than transit (1–18 points) • Increased Transit Accessibility (1–25 points) • Infill location that reduces vehicle trips or VMT beyond the measures described above (points TBD based on traffic data).	TBD	/
Residential Near Local Retail (Residential-only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT). The suburban project will have at least three of the following on site and/or off site within ¼-mile: Residential Development, Retail Development, Park, Open Space, or Office. The mixed-use development should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping.	1–16 points	2
Traffic Flow Management Improvements			
Signal Synchroni-zation	Techniques for improving traffic flow include: traffic signal coordination to reduce delay, incident management to increase response time to breakdowns and collisions, Intelligent Transportation Systems (ITS) to provide real-time information regarding road conditions and directions, and speed management to reduce high free-flow speeds. • Signal synchronization • Traffic signals connected to existing ITS	1 point/signal 3 points/signal	0
Increase Public Transit			
Public Transit Access	The point value of a project's ability to increase public transit use will be determined based upon a Transportation Impact Analysis (TIA) demonstrating decreased use of private vehicles and increased use of public transportation. Increased transit accessibility (1–15 points)	TBD	/
Reduction Measure: Install Electric Chargers			
Single-family DU EV Chargers	Installation of Electric Vehicle (EV) chargers in the garage of single-family DUs: • Level 1 110 volt AC Chargers • Level 2 240 volt AC Fast Chargers	2 points 5 points	2
Multi-family DU EV Chargers	Installation of Electric Vehicle (EV) chargers in the parking areas of Multi-family Residential Development: • Level 1 110 volt AC Chargers • Level 2 240 volt AC Fast Chargers	2 points/charger 5 points/ charger	0

Table 1: Screening Table for Implementing GHG Performance Standards for Residential Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure: Adopt and Implement a Bicycle Master Plan to Expand Bike Routes around the County			
Sidewalks	• Provide sidewalks on both sides of the street (required) • Provide pedestrian linkage between residential and commercial uses within 1 mile	1 point 3 points	1
Bicycle Paths	• Provide bicycle paths within project boundaries • Provide bicycle path linkages between residential and other land uses • Provide bicycle path linkages between residential and transit	TBD 2 points 5 points	0
Reduction Measure Waste-2 : Reduce Waste to Landfills			
Recycling	County-initiated recycling program diverting 100% of waste requires coordination in neighborhoods to realize this goal. The following recycling features will help the County fulfill this goal: • Provide green waste composting bins at each residential unit • Multifamily residential projects that provide dedicated recycling bins separated by types of recyclables combined with instructions/education program explaining how to use the bins and the importance of recycling • Construction waste recycling	 4 points 3 points 4 points	4
Other GHG Reduction Feature Implementation			
Other GHG Emissions Reduction Features	This allows innovation by the applicant to provide residential design features for the GHG emissions from construction and/or operation of the project not provided in the table. Note that engineering data will be required documenting the GHG reduction amount and point values given based upon emission reductions calculations using approved models, methods, and protocols.	TBD	/
Total Points Earned by Residential Project:			123

GENERAL BIOLOGICAL ASSESSMENT FOR APN 0605-051-01

SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

JT Santorini Villa LLC
1751 Colorado Boulevard, Suite 333
Los Angeles, California 90041

Submitted to:

County of San Bernardino
385 North Arrowhead Avenue
San Bernardino, California 92415

Prepared by:

Juan J. Hernandez
Hernandez Environmental Services
c/o Brian F. Smith and Associates, Inc.
14010 Poway Road, Suite A
Poway, California 92064

August 4, 2025

BFSA Environmental Services
A Perennial Company

GENERAL BIOLOGICAL ASSESSMENT
FOR
APN 0605-051-01

SAN BERNARDINO COUNTY
CALIFORNIA

Prepared for:

Ms. Jennifer Stropes
Brian F. Smith & Associates
14010 Poway Road, Suite A
Poway, CA 92064

Prepared by:

Hernandez Environmental Services
17037 Lakeshore Drive
Lake Elsinore, CA 92530

JULY 2025

TABLE OF CONTENTS

1.0 Introduction 4
1.1 Project Site Location 4
1.2 Project Description 4
2.0 Methodology 4
2.1 Literature Review 4
2.2 Field Survey 4
3.0 Existing Conditions and Results 5
3.1 Environmental Setting 5
3.2 Plant and Habitat Communities 5
3.3 Wildlife 5
3.4 Regional Connectivity/Wildlife Movement 5
3.5 Sensitive Biological Resources 6
3.5.1 Sensitive Plant Resources 6
3.5.2 Sensitive Animal Resources 7
3.6 Critical Habitat 8
3.7 Nesting Birds 8
3.8 Jurisdictional Waters 8
4.0 Project Impacts 9
4.1 Impacts to Habitats 9
4.2 Impacts to Sensitive Species 9
4.3 Impacts to Nesting Birds 10
4.4 Impacts to Critical Habitat 10
4.5 Impacts to Wildlife Movement Corridors 10
4.6 Conflict with Local Policies or Ordinances Protecting Biological Resources 10
4.8 State and Federal Drainages 11
5.0 Recommendations 11
6.0 Certification 13
7.0 References 14

FIGURES

Figure 1 – Location Map
Figure 2 – Vicinity Map
Figure 3 – Project Plans
Figure 4 – Habitat Map
Figure 5 – Impact Map

APPENDICES

Appendix A – Observed Species List
Appendix B – Potential Species List
Appendix C – Site Photographs

1.0 Introduction

Hernandez Environmental Services (HES) was contracted by Brian F. Smith and Associates to prepare a General Biological Assessment (GBA) for an approximately 81.2-acre project site in the unincorporated community of Joshua Tree, San Bernardino County, California. The project site consists of Assessor's Parcel Number (APN) 0605-051-01.

1.1 Project Site Location

The project site is located at the southeast corner of Broadway Street and Laferney Avenue. Specifically, the project site is located within Section 20, Township 1 north and Range 7 east, in the *Joshua Tree North* United States Geological Survey (USGS) 7.5' topographic quadrangle. The center point latitude and longitude for the project site are 34.16253628° North, 116.26901863° West (Figures 1 and 2).

1.2 Project Description

The proposed project includes the subdivision of the site into 29 residential lots and the extension of Delaware Ave, California Ave, and Arizona Ave on site. The proposed project includes associated parking, landscaping, access roads, and utilities. (Figure 3).

2.0 Methodology

2.1 Literature Review

HES conducted a literature review and reviewed aerial photographs and topographic maps of the project site and surrounding areas. The *Joshua Tree North* and eight surrounding USGS 7.5' topographic quadrangles were used to identify sensitive species with the California Natural Diversity Data Base (CNDDB), the U.S. Fish and Wildlife Service (USFWS) Endangered Species Lists, and the California Native Plant Society (CNPS) rare plant lists to obtain species information for the project area. The CNDDB and USFWS critical habitat databases were utilized, together with Geographic Information System (GIS) software, to locate the previously recorded locations of sensitive plant and wildlife occurrences and designated critical habitat and determine the distance from the project site.

2.2 Field Survey

On July 16, 2025, HES conducted a field survey of the project site. The ambient temperature at 11:30 A.M. was 90-93 degrees Fahrenheit, sunny, with winds ranging from zero to eleven miles per hour from the northeast. The purpose of the field survey was to document the existing habitat conditions, obtain plant and animal species information, view the surrounding land uses, assess the potential for state and federal waters, assess the potential for wildlife movement corridors, and assess the presence of constituent elements for critical habitat, if present.

Linear transects spaced approximately 50 to 100 feet apart were walked across the project site for 100 percent coverage. All species observed were recorded. Global Positioning System (GPS) waypoints were taken to delineate specific habitat types, species locations, state or federal waters, and any other information that would be useful for the assessment of the project site. A comprehensive list of all plant and wildlife species that were detected during the field survey within the project site is included in Appendix A. Sensitive plant and wildlife species with the potential to occur within the project area are listed in Appendix B. Representative site photographs were taken and are included within Appendix B.

3.0 Existing Conditions and Results

3.1 Environmental Setting

The project site consists entirely of vacant land with creosote bush scrub habitat and some disturbed areas with sparse nonnative vegetation. The site is bordered by residential development to the east and west and vacant land to the north and south. There is a shallow wash that crosses the site from the northeast to southwest. The site is relatively flat with onsite elevations ranging from 2,473 feet above mean sea-level (AMSL) to 2,523 feet AMSL.

3.2 Plant and Habitat Communities

The 81.2-acre project site has two habitats, 79.91 acres of creosote bush scrub and 1.29 acres of disturbed habitat (Figure 4).

Creosote bush scrub
The project site has 79.91 acres of creosote bush scrub habitat on site. The dominant plant species on site is creosote (*Larrea tridentata*). Other plant species found on site include white bursage (*Ambrosia dumosa*), silver cholla (*Cylindropuntia echinocarpa*), beavertail (*Opuntia basilaris*), big galleta (*Hilaria rigida*), and sparse Joshua trees (*Yucca brevifolia*).

Disturbed
The project site has 1.29 acres of disturbed habitat on site. This habitat consists of graded dirt roads with no vegetation.

3.3 Wildlife

General wildlife species documented on the project site or within the vicinity of the site include the desert iguana (*Dipsosaurus dorsalis*), western whiptail (*Cnemidophorus tigris*), cactus wren (*Campylorhynchus brunneicapillus*), and American kestrel (*Falco sparverius*).

3.4 Regional Connectivity/Wildlife Movement

Wildlife movement corridors link together areas of suitable habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbances. The project area was evaluated

for its function as a wildlife corridor that species use to move between wildlife habitat zones. The project area consists of vacant land with a braided ephemeral channel that crosses the site. The channel on site leads to fenced residential development to the southwest of the site and would not function as a wildlife corridor. The site is bordered by vacant land but there is scattered residential development to the south, west and east that separate the site from other open deserts. Furthermore, there is vacant land to the east of the site that can continue to be used. No wildlife movement corridors were found to be present on the project site. Development of the site will not block any wildlife corridors or prevent species from moving between wildlife habitat zones.

3.5 Sensitive Biological Resources

According to the CNDDB, a total of 19 sensitive species of plants and 23 sensitive species of animals have the potential to occur on or within the vicinity of the project area. These include those species listed or candidates for listing by the U. S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW) and California Native Plant Society (CNPS). All habitats with the potential to be used by sensitive species were evaluated during the site visit and a determination has been made for the presence or probability of presence within this report. This section will address those species listed as Candidate, Rare, Threatened, or Endangered under the state and federal endangered species laws. Sensitive species which have a potential to occur will also be discussed in this section. Other special status species are addressed within Appendix B.

3.5.1 Sensitive Plant Resources

A total of 3 plant species are listed as state and/or federal Threatened, Endangered, or Candidate species; are 1B.1 listed plants on the CNPS Rare Plan Inventory; below are descriptions of these species:

Triple-ribbed milk-vetch
The triple-ribbed milk-vetch (*Astragalus tricarinatus*) is a federally listed Endangered species and ranked 1B.2 in the CNPS Rare Plant Inventory. Its habitats include desert wash, Joshua tree woodland, and sonoran desert scrub habitats. It is often found on hot, rocky slopes in canyons and along edge of boulder-strewn desert washes with *Larrea* sp. and *Encelia* sp. No slopes or canyons occur on site. No habitat for this species exists on the project site. **This species is not present.**

Parish's daisy
Parish's daisy (*Erigeron parishii*) is a is a federally Threatened Species and is ranked 1B.1 in the CNPS Rare Plant Inventory. This species is typically found on carbonate; limestone mountain slopes; often associated with drainages and sometimes on granite. Its habitat includes Mojavean

desert scrub, pinyon and juniper woodland. The project site is below the elevation range for this species. No habitat for this species exists on the project site. **This species is not present.**

Western Joshua tree
Western Joshua tree (*Yucca brevilfolia*) is listed as a Candidate Species under the California Endangered Species Act (CESA), which requires authorization from CDFW for any take of the species (including removal of western Joshua tree or similar actions). This species is generally found at moderate elevations in the Mojave Desert between creosote bush scrub and pinyon-juniper woodlands. Suitable habitat is present on the project site. **This species is present**.

3.5.2 Sensitive Animal Resources

A total of 3 animal species are listed as state and/or federal Threatened, Endangered, Candidate will be reviewed in this section. Sensitive species with a potential to occur on site will also be reviewed in this section. Below are descriptions of these species:

Burrowing owl
Burrowing owl (*Athene cunicularia*) is a CDFW Species of Special Concern. This species is a subterranean nester, dependent upon burrowing mammals such as the California ground squirrel. It inhabits open, dry annual or perennial grasslands and scrublands characterized by low-growing vegetation. There are occurrences of this species recorded on CNDDB within 2 miles of the site. **This species has the potential to be present.**

Crotch bumble bee
Crotch bumble bee (*Bombus crotchii*) is a state Candidate Endangered species. Its located in coastal California east to the Sierra-Cascade crest and south into Mexico. Its food plan genera include *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia*, and *Eriogonum*. The food plant genera of this species is not found on site. There is no habitat for this species on the project site. **This species is not present.**

Desert tortoise
Desert tortoise (*Gopherus agassizii*) is a state and federally listed Threatened species. This species is found in Joshua tree woodland, Mojavean desert scrub, and Sonoran Desert scrub habitats. It requires friable soil for burrow and nest construction. It prefers creosote bush habitat with large annual wildflower blooms. There are occurrences of this species recorded on CNDDB within 5 miles of the site. Suitable habitat occurs on site. **This species has the potential to be present**.

Bendire's Thrasher

Bendire's thrasher (Toxostoma bendirei) is a CDFW Species of Special Concern. This species a migratory; local spring/ummer resident in flat areas of desert succulent shrub/ Joshua tree habitats in Mojave Desert. It nests in *Cholla* sp., *Yucca* sp., *Palo verde*, thorny shrubs or small trees usually 0.5 to 20 feet above the ground. Suitable habitat occurs on site. **This species has the potential to be present**.

Le Conte's Thrasher

Le Conte's Thrasher (*Toxostoma lecontei*) is a CDFW Species of Special Concern. This species is a desert resident. This species habitats include open desert wash, desert scrub, alakli desert scrub, and desert succulent scrub habitat. Suitable habitat for this species occurs on site. **This species has potential to be present.**

Least Bell's vireo

Least Bell's vireo (*Vireo bellii pusillus)* is a federal and state listed Endangered Species. This species is found in riparian forest, riparian scrub, and riparian woodland. Nesting habitat of this species is restricted to willow and/or mule fat dominated riparian scrub along permanent or nearly permanent streams. No suitable habitat for this species is present on the project site. **This species is not present.**

3.6 Critical Habitat

Critical habitat is designated by USFWS for endangered and threatened species per the federal ESA (16 U.S.C. § 1533 (a)(3)), and to the extent prudent and determinable. Special management of critical habitat, including measures for water quality and quantity, host animals and plants, food availability, pollinators, sunlight, and specific soil types is required to ensure the long-term survival and recovery of the identified species. Critical habitat designation delineates all suitable habitat for the species. The project site is not located within or adjacent to federally designated critical habitat for endangered species.

3.7 Nesting Birds

Migratory non-game native bird species are protected under the federal Migratory Bird Treaty Act. Additionally, Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests. The project site contains shrubs and trees that can be utilized by nesting birds and raptors during the nesting bird season of February 1 through September 15.

3.8 Jurisdictional Waters

The project site contains one braided ephemeral channel that crosses the site from the northeast to the southwest. The ephemeral braided channel that is potential CDFW and Regional Water Quality Control Board (RWQCB) jurisdictional waters. The onsite drainage leads to a dirt road

and has no visible physical surface connection to any federal jurisdictional waters. No wetlands occur on site.

4.0 Project Impacts

Impacts to Habitats

The proposed project is expected to impact the entire 81.2-acre site. Implementation of the proposed project will impact approximately 79.91 acres of creosote bush scrub and 1.29 acres of disturbed habitat (Figure 5).

4.2 Impacts to Sensitive Species

Western Joshua tree

The Western Joshua tree is a state listed Candidate Endangered species. This species is protected under the Western Joshua Tree Conservation Act and the California Endangered Species Act (CESA), which prohibits the take of any species of wildlife designated by the California Fish and Game Commission as endangered, threatened, or candidate species. Three individual Joshua trees were found during the general biological assessment. Implementation of the measures outlined in the Recommendations section of this report will ensure impacts to this species are less than significant.

Desert tortoise

Desert tortoise is a state and federally listed Threatened species. This species is found in Joshua tree woodland, Mojavean desert scrub, and Sonoran Desert scrub habitats. It requires friable soil for burrow and nest construction. It prefers creosote bush habitat with large annual wildflower blooms. Suitable habitat occurs on site. Implementation of the measures outlined in the Recommendations section of this report will ensure impacts to this species are less than significant.

Bendire's Thrasher

Bendire's thrasher is a CDFW Species of Special Concern. This species a migratory; local spring/ummer resident in flat areas of desert succulent shrub/ Joshua tree habitats in Mojave Desert. It nests in *Cholla* sp., *Yucca* sp., *Palo verde*, thorny shrubs or small trees usually 0.5 to 20 feet above the ground. Suitable habitat occurs on site. Implementation of the measures outlined for nesting birds in the Recommendations section of this report will ensure impacts to this species are less than significant.

Le Conte's Thrasher

Le Conte's Thrasher is a CDFW Species of Special Concern. This species is a desert resident. This species habitats include open desert wash, desert scrub, alakli desert scrub, and desert succulent scrub habitat. Suitable habitat for this species occurs on site. Implementation of the measures outlined for nesting birds in the Recommendations section of this report will ensure impacts to this species are less than significant.

4.3 Impacts to Nesting Birds

Potential impacts to nesting birds may occur if ground disturbing activities or vegetation removal occur during the bird nesting season of February 1 through September 15. Implementation of the measures identified in the Recommendations section of this report will ensure that potential impacts to nesting birds are less than significant.

4.4 Impacts to Critical Habitat

The project site is not within federal critical habitat. No impacts to federal critical habitat are expected.

4.5 Impacts to Wildlife Movement Corridors

No wildlife movement corridors were found to be present on the project site. No impacts are expected.

4.6 Conflict with Local Policies or Ordinances Protecting Biological Resources

The San Bernardino County Development Code Section 88.01.060 provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources. Per Section 88.01.060 of the San Bernardino County Development Code the following desert native plants or any part of them, except the fruit shall not be removed except under a Tree or Plant Removal Permit:

(1) The following desert native plants with stems two inches or greater in diameter or six feet or greater in height:

(A) Dalea spinosa (smoketree).

(B) All species of the genus Prosopis (mesquites).

(2) All species of the family Agavaceae (century plants, nolinas, yuccas).

(3) Creosote Rings, ten feet or greater in diameter.

(4) All Joshua trees.

(5) Any part of any of the following species, whether living or dead:

(A) Olneya tesota (desert ironwood).

(B) All species of the genus Prosopis (mesquites).

(C) All species of the genus Cercidium (palos verdes).

Three Joshua trees are located on or adjacent to the project site. No other desert native plants regulated under Section 88.01.060 of the San Bernardino Development Code are present on the site. Section 88.01 requires the issuance of a permit prior to the removal of regulated trees and plants. Implementation of the measure outlined in the Recommendations section of this report would ensure that no conflicts with local policies or ordinances are expected.

4.7 Conflict with the Provisions of an Adopted Habitat Conservation Plan, Natural Community Conservation Plan, or Other Approved Local, Regional, or State Habitat Conservation Plan

The Project would not be anticipated to conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.8 State and Federal Drainages

The proposed project is expected to impact the entire site including the state jurisdictional drainage on site. A jurisdictional delineation will need to be performed to determine the extent of state waters on site. CDFW and RWQCB jurisdictional waters, are regulated by state, and local governments under a no-net-loss policy, and all impacts are considered significant and should be avoided to the greatest extent possible. Impacts to jurisdictional waters require mitigation through habitat creation, restoration, or enhancement as determined by consultation with the regulatory agencies during the permitting process. Any impacts to CDFW jurisdiction would require a Section 1602 Streambed Alteration Agreement from CDFW. Any impacts to waters of the State would require a WDR under Porter-Cologne from the RWQCB. Mitigation for impacts to jurisdictional resources would be addressed in a mitigation plan to be submitted for approval with the permit application packages.

5.0 Recommendations

Based upon the findings of this report, it is recommended that the following studies or surveys be performed as part of the project.

<u>Western Joshua tree</u>

- Three Joshua trees were found on site during the general biological assessment survey. A focused Western Joshua Tree census survey would need to be performed to ensure no other Joshua trees occur on site.

- Any impacts to the Joshua tree would require compliance with the Western Joshua Tree Conservation Act (WJTCA) which was passed in July 2023 to conserve western Joshua tree and its habitat while supporting the state's renewable energy and housing priorities. The WJTCA authorizes CDFW to:
    - Permit the trimming and removal of hazardous or dead western Joshua trees.
    - Permit the incidental take of western Joshua trees under CESA provided the permittee meets certain conditions.

  Any proposed impacts to the Joshua trees on site would require prior authorization from CDFW.
- Removal of onsite Joshua trees would be required to comply with Section 88.01 of the San Bernardino Development Code, which requires the issuance of a permit prior to the removal of regulated trees and plants.

Nesting Birds

- It is recommended that vegetation removal be conducted outside of the nesting season for migratory birds to avoid direct impacts.

- If vegetation removal occurs during the migratory bird nesting season, between February 1 and September 15, pre-construction nesting bird surveys shall be performed within three days prior to vegetation removal.

- If active nests are found during nesting bird surveys, they shall be flagged. A 250-foot buffer shall be fenced around songbird nests and a 500-foot buffer shall be fenced around raptor nests.

Wildlife

- Focused presence absence surveys for desert tortoise should be performed onsite.

- Focused burrowing owl surveys following the guidelines in Appendix D of the 2012 Department of Fish and Game *Staff Report on Burrowing Owl Mitigation* should be performed on site by a qualified biologist.

6.0 Certification

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date 07/29/2025 Signed _____

Principal Biologist

Fieldwork Performed By:

Sarah Vasquez

_____

Biologist/Project Manager

7.0 References

Burt, W. H., 1986. A Field Guide to the Mammals in North American North of Mexico. Houghton Mifflin Company, Boston, Massachusetts.

California Department of Fish and Wildlife (CDFW), Natural Diversity Database (CNDDB). Accessed July 2025 California Department of Fish and Wildlife, Sacramento, California.

Garrett, K. and J. Dunn, 1981. Birds of Southern California. Los Angeles Audubon Society. The Artisan Press, Los Angeles, California.

Grenfell, W. E., M. D. Parisi, and D. McGriff, 2003. A Check-list of the Amphibians, Reptiles, Birds and Mammals of California. California Wildlife Habitat Relationship System, California Department of Fish and Game, Sacramento, California.

Grinnell, J., 1933. Review of the Recent Mammal Fauna of California. University of California Publications in Zoology, 40:71-234.

Hall, E. R., 1981. The Mammals of North America, Volumes I and II. John Wiley and Sons, New York, New York.

Hickman, J. C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press.

Ingles, L. G., 1965. Mammals of the Pacific States. Stanford University Press, Stanford, California.

Jameson, jr., E. W. and H. J. Peters. California Mammals. University of California Press, Berkeley, Los Angeles, London. 403 pp.

Jepson Flora Project (eds.) 2025, *Jepson eFlora*, https://ucjeps.berkeley.edu/eflora/

John C. La Duke 2012, *Sphaeralcea rusbyi var. eremicola*, in Jepson Flora Project (eds.) *Jepson eFlora*, https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=79172

List of Vegetation Alliances and Associations. Vegetation Classification and Mapping Program, California Department of Fish and Game. Sacramento, CA. September 2010.

Meserve, P. 1976. Food relationships of a rodent fauna in a California coastal sage scrub community. Journal of Mammalogy, 57: 300-319.

Munz, P.A., 1974. A Flora of Southern California. University of California Press, Berkeley, California.

Peterson, R. 1990 *A Field Guide to Western Birds*. Houghton Mifflin Company, Boston, MA.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens 2009 *A Manual of California Vegetation, 2nd edition*. California Native Plant Society Press, Sacramento, CA.

U.S. Fish and Wildlife Service, 1998b. Endangered and Threatened Wildlife and Plants; Final Rule to List the San Bernardino Kangaroo Rat as Endangered, Vol. 63, No. 185, pp. 51005 – 51017.

U.S Fish and Wildlife Service, 2014. Endangered and Threatened Wildlife and Plants. https://www.fws.gov/endangered/species/us-species.html. Accessed July 2025.

Williams, D. F., 1986. Mammalian Species of Special Concern in California. Wildlife Management Division Administrative Report 86-1. Prepared for The Resources Agency, California Department of Fish and Game.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer and M. White, 1990. California's Wildlife, Volume III Mammals, The Resources Agency, Department of Fish and Game, Sacramento, California.

FIGURE 1

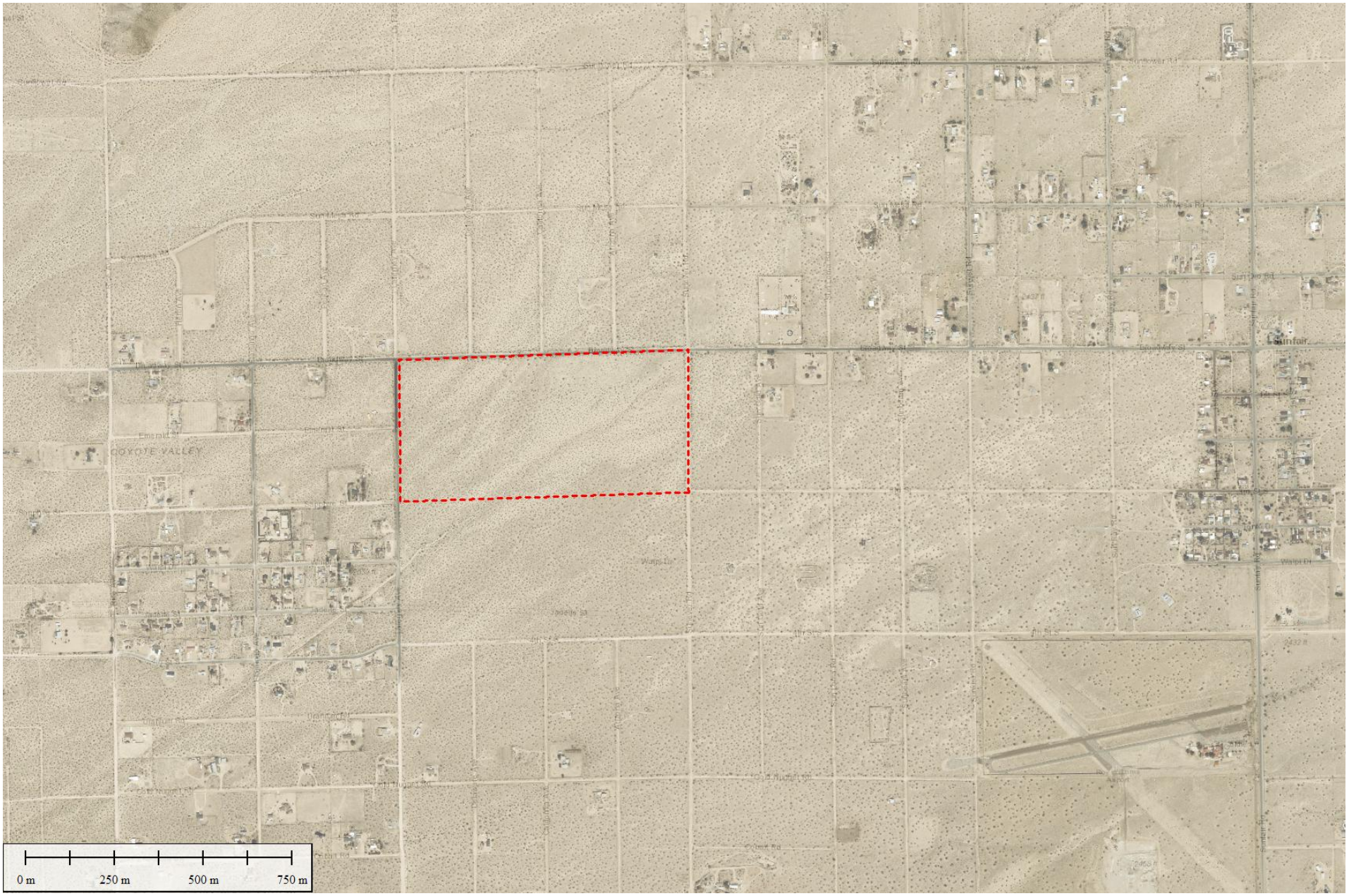


Figure 1
Location Map
Joshua Tree Estates
APN 0605-051-01
San Bernardino County, California

Legend

Property Line

N

Hernandez Environmental Services

FIGURE 2

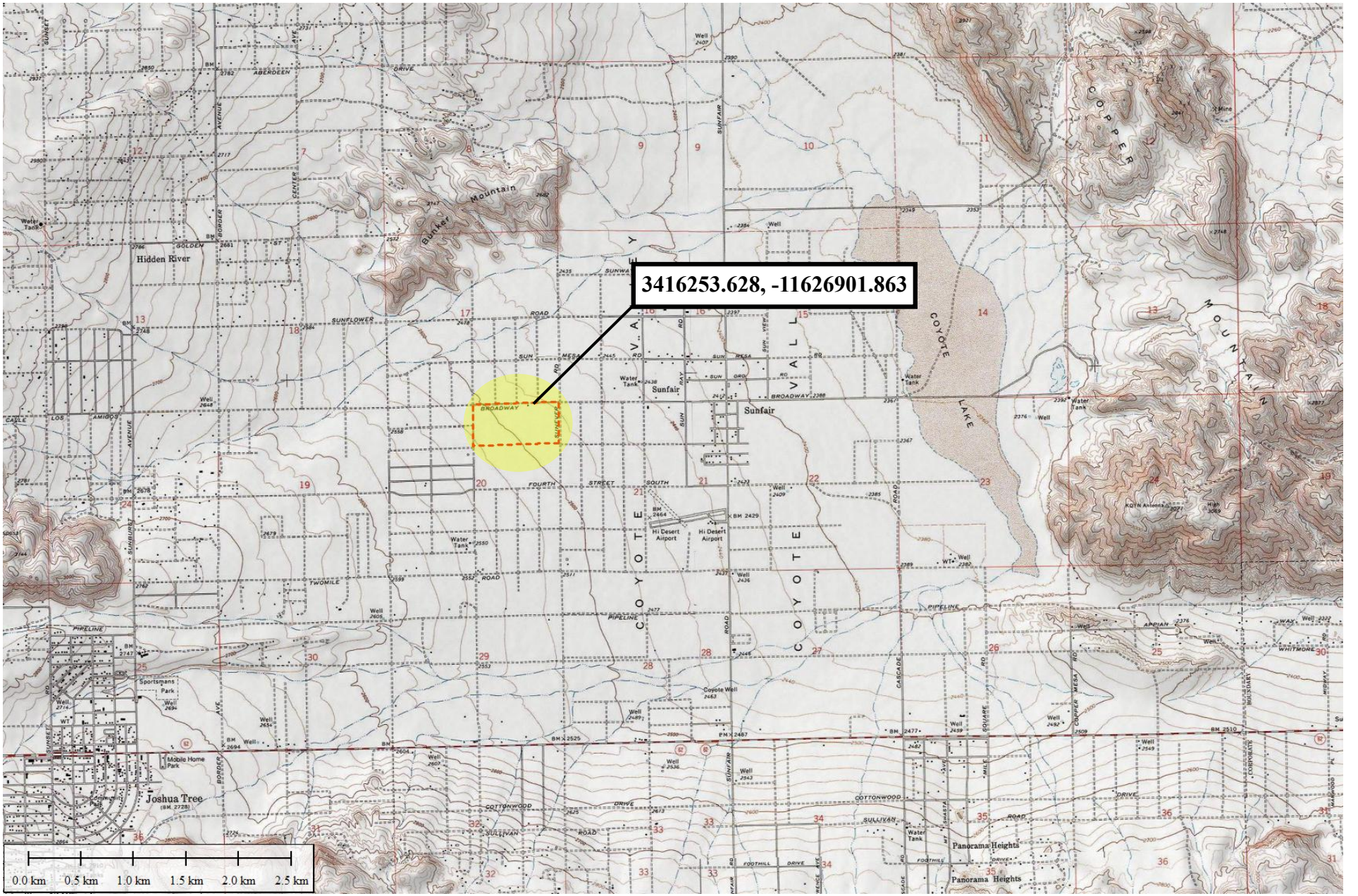


Figure 2

Vicinity Map
Joshua Tree Estates
APN 0605-051-01
San Bernardino County, California

Legend

Property Line

N

Hernandez Environmental Services

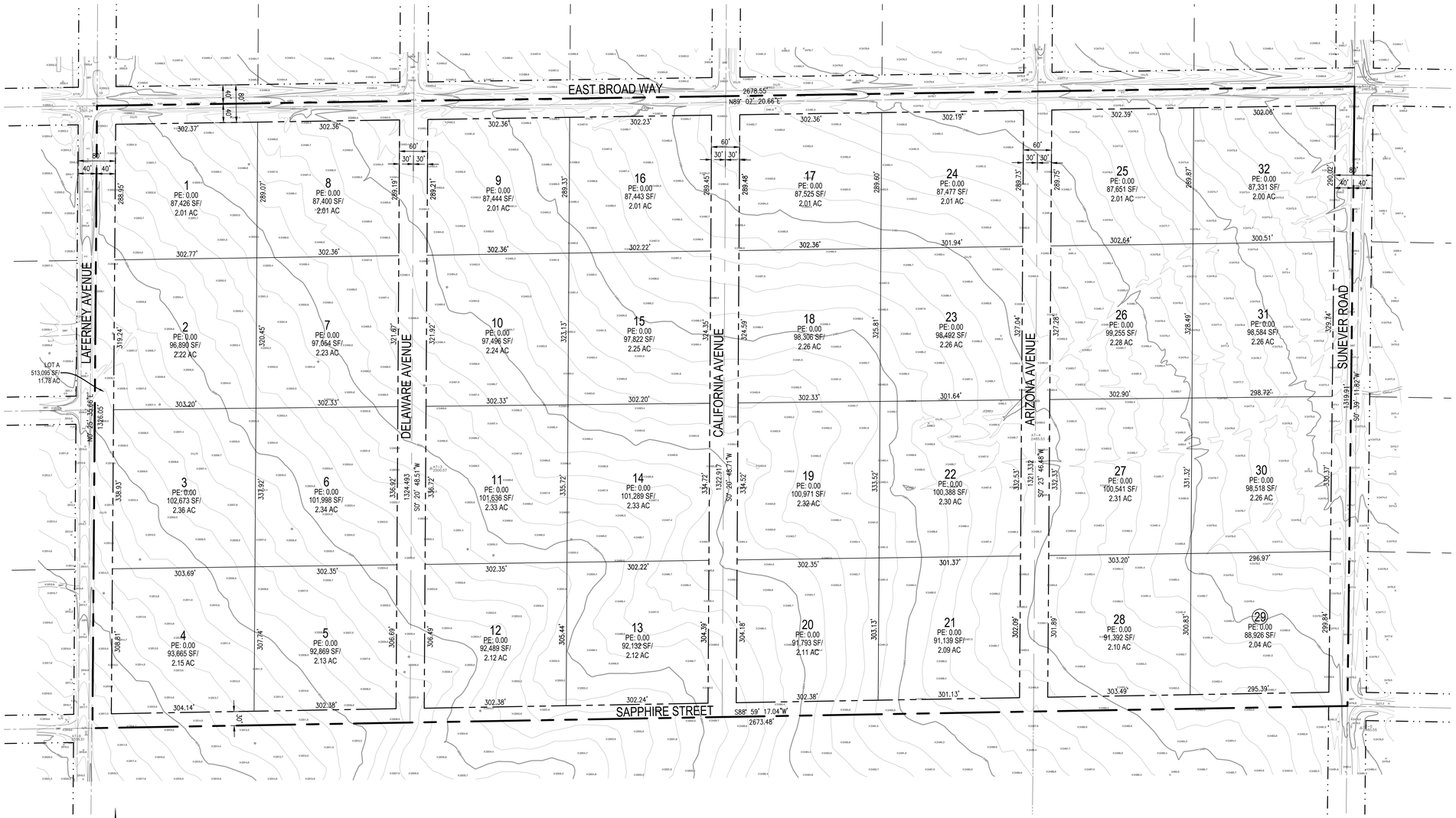
FIGURE 3

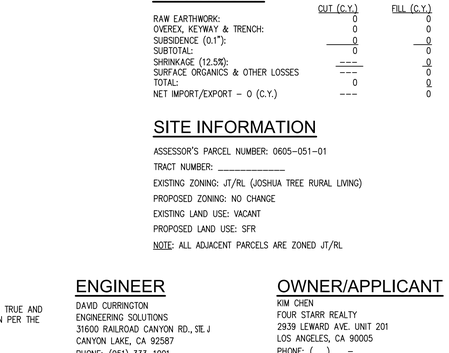
JOSHUA TREE ESTATES

TENTATIVE TRACT No. _____

COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
JULY, 2022

FOR OFFICIAL USE ONLY

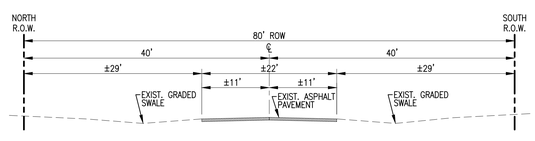




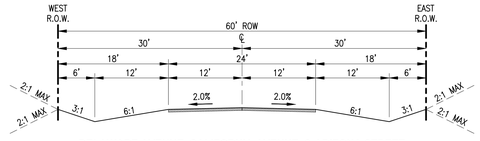
VICINITY MAP
N.T.S.

N

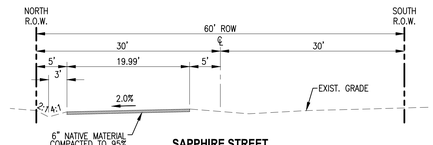
1"=100' 0 100' 200' 300'



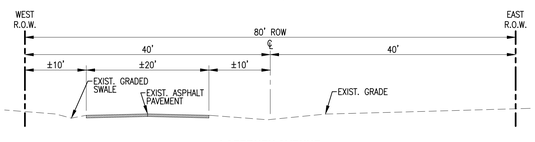
EAST BROADWAY
1" = 10'



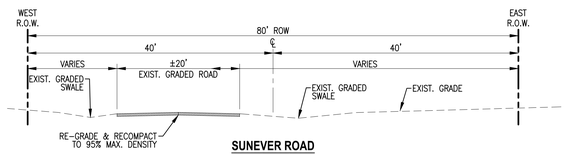
DELAWARE AVENUE, CALIFORNIA AVENUE, & ARIZONA STREET
1" = 10'



SAPPHIRE STREET
1" = 10'



LAFERNEY AVENUE
1" = 10'



SUNEVER ROAD
1" = 10'

LEGEND

- PROJECT BOUNDARY
- RIGHT OF WAY
- STREET CENTERLINE
- 1640 EXISTING CONTOUR
- 1640 PROPOSED CONTOUR
- FLOWLINE
- 2:1 PROPOSED SLOPE W/SLOPE RATIO
- FLOW DIRECTION

ABBREVIATIONS

FS	FINISH SURFACE ELEVATION
PE	PAD ELEVATION
H.P.	HIGH POINT
L.P.	LOW POINT
H=2.5'	HEIGHT OF WALL OR D.F.
T/G	TOP OF GRATE INLET
T/S	TOP OF SLOPE
G.B.	GRADE BREAK
FL	FLOWLINE

LEGAL DESCRIPTION

NORTH HALF OF NORTHEAST QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 1 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO

ASSESSOR'S PARCEL NUMBER: 0605-051-01

UTILITY PROVIDERS

ELECTRIC:
SOUTHERN CALIFORNIA EDISON COMPANY
P.O. BOX 11482
SANTA ANA, CA 92711
(714) 796-9920

TELEPHONE:
AT&T
(800) 310-2355

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9191

TRASH SERVICES:
4878 NEWTON ROAD
YUCCA VALLEY, CA 92284
(760) 340-2113

SITE SUMMARY

TOTAL SITE ACREAGE (GROSS):	81.2 AC.
ADD. R.O.W. TO BE DEDICATED:	11.0 AC.
TOTAL SITE ACREAGE (NET):	70.2 AC.
TOTAL NUMBER OF RESIDENTIAL LOTS:	29

EARTHWORK

	CUT (C.Y.)	FILL (C.Y.)
RAW EARTHWORK:	0	0
OVEREX, KEYWAY & TRENCH:	0	0
SUBSIDENCE (0.1"):	0	0
SUBTOTAL:	0	0
SHRINKAGE (12.5%):	---	0
SURFACE ORGANICS & OTHER LOSSES	---	0
TOTAL:	0	0
NET IMPORT/EXPORT = 0 (C.Y.)	---	0

SITE INFORMATION

ASSESSOR'S PARCEL NUMBER: 0605-051-01
TRACT NUMBER: _____
EXISTING ZONING: JT/RL (JOSHUA TREE RURAL LIVING)
PROPOSED ZONING: NO CHANGE
EXISTING LAND USE: VACANT
PROPOSED LAND USE: SFR
NOTE: ALL ADJACENT PARCELS ARE ZONED JT/RL

ENGINEER'S STATEMENT

THIS TENTATIVE TRACT MAP WAS PREPARED UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, ALL EASEMENTS OF RECORD ARE SHOWN PER THE TITLE REPORT DATED _____ BY _____ TITLE COMPANY.

DAVID CURRINGTON, RCE 58883 DATE

ENGINEER

DAVID CURRINGTON
ENGINEERING SOLUTIONS
31600 RAILROAD CANYON RD., STE J
CANYON LAKE, CA 92587
PHONE: (951) 333-1001
EMAIL: davidc@engineeringsolutionsca.com

OWNER/APPLICANT

KIM CHEN
FOUR STARR REALTY
2939 LEWARD AVE. UNIT 201
LOS ANGELES, CA 90005
PHONE: ( ) -
EMAIL:

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
ENGINEERING SOLUTIONS
31600 RAILROAD CANYON RD., SUITE J
CANYON LAKE, CA 92587
PHONE: (951) 784-0286
DAVID G. CURRINGTON R.C.E. C58883 DATE EXP. 06-30-23

REGISTERED PROFESSIONAL ENGINEER DAVID G. CURRINGTON No. CE 58883 Exp. 6-30-23 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF LAND USE SERVICES
SAN BERNARDINO COUNTY
RECOMMENDED BY: _____ DATE
APPROVED BY: _____ DATE

TENTATIVE TRACT MAP
TRACT No._____
APN: 0605-051-01
JOSHUA TREE

DATE PREPARED: 8/9/2022
FILE NO.
SHEET 1 OF 1

FIGURE 4

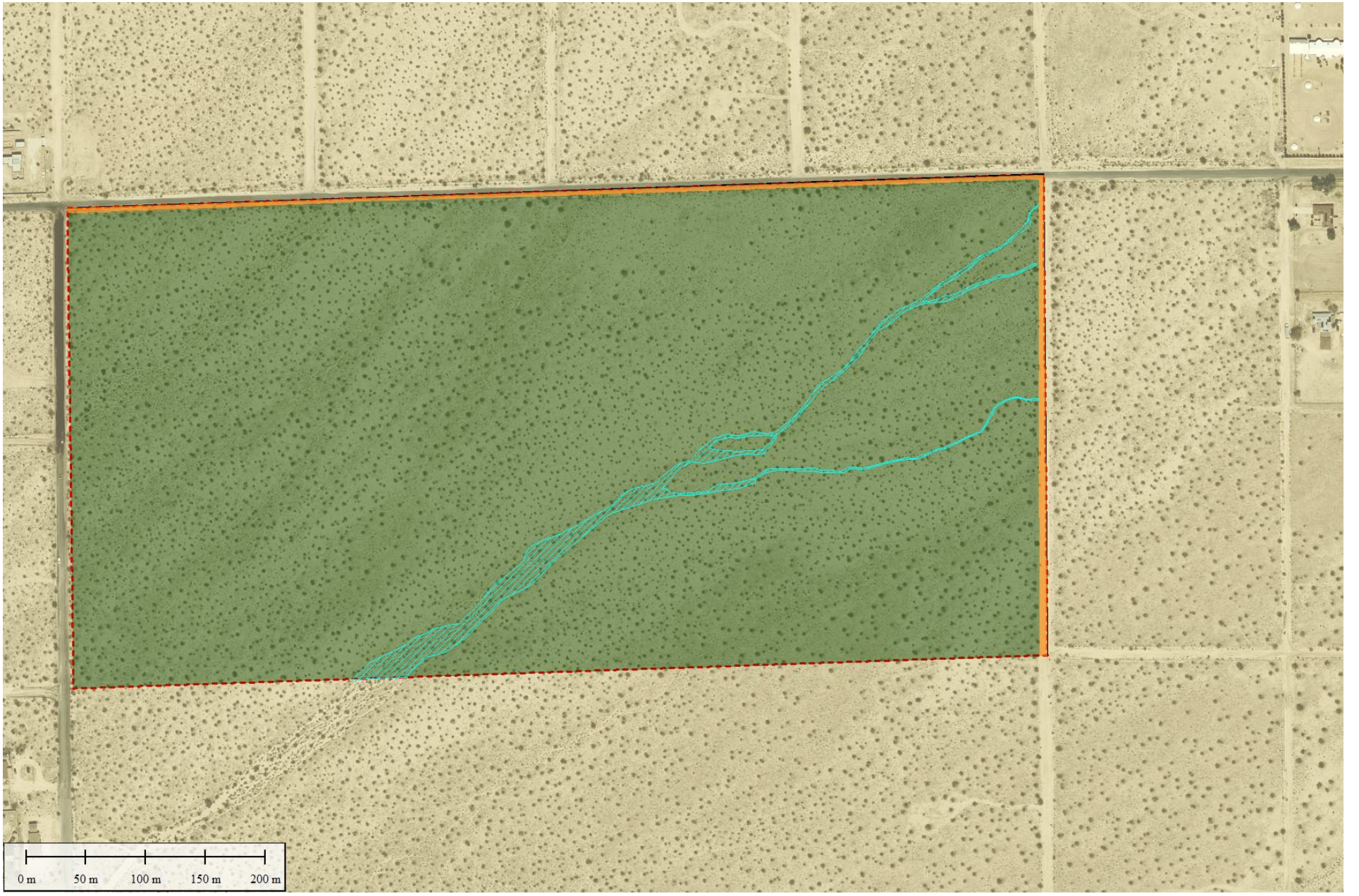


Figure 4

Habitat Map
Joshua Tree Estates
APN 0605-051-01
San Bernardino County, California

Legend

- Property Line
- Creosote Bush Scrub (79.91 Acres)
- Disturbed Areas (1.29 Acres)
- Ephemeral Wash

N

Hernandez Environmental Services

FIGURE 5

Figure 5

Impact Map
Joshua Tree Estates
APN 0605-051-01
San Bernardino County, California

APPENDIX A

Observed Species List

Plant List

Scientific Name	Common Name
Ambrosia dumosa	White bursage
Ambrosia salsola	Burrobrush
Adenophyllum sp.	Dogweed
Brickellia incana	Woolly brickellbush
Croton californicus	Desert croton
Cylindropuntia echinocarpa	Silver cholla
Cylindropuntia ramosissima	Branched pencil cholla
Eriastrum eremicum	Desert Woolystar
Ericameria sp.	Goldenbush
Euphorbia micromera	Sonoran sandmat
Hilaria rigida	Big galleta
Larrea tridentata	Creosote
Opuntia basilaris	Beavertail cactus
Palafoxia arida	Desert palafox
Schismus sp.	Mediterranean grass
Senna armata	Spiny senna
Stephanomeria pauciflora	Brownplume wirelettuce
Tiquilia plicata	Fanleaf crinklemat
Yucca brevifolia	Joshua tree

Wildlife List

Scientific Name	Common Name
Aspidoscelis tigris	Western whiptail
Corvus corax	Common raven
Dipsosaurus dorsalis	Desert iguana
Falco sparverius	American kestrel
Lepus californicus	Black-tailed jackrabbit

APPENDIX B

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Astragalus bernardinus	San Bernardino milk-vetch	Dicots	None	None	1B.2	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden | USFS_S-Sensitive	Joshua tree woodland | Limestone | Pinon & juniper woodlands	Joshua tree woodland, pinyon and juniper woodland.	Granitic or carbonate substrates. 290-2290 m.	No suitable habitat occurs on site. **This species is not present**.
Astragalus tricarinatus	triple-ribbed milk-vetch	Dicots	Endangered	None	1B.2	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Desert wash | Joshua tree woodland | Sonoran desert scrub	Joshua tree woodland, Sonoran desert scrub.	Hot, rocky slopes in canyons and along edge of boulder-strewn desert washes, with Larrea and Encelia. 455-1585 m.	No slopes or canyons occur on site. No suitable habitat occurs on site. **This species is not present**.

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Berberis fremontii	Fremont barberry	Dicots	None	None	2B.3	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Joshua tree woodland | Pinon & juniper woodlands	Pinyon and juniper woodland, Joshua tree woodland.	Rocky, sometimes granitic. 1140-1770 m.	The elevation range for this species is above the project site. **This species is not present.**
Boechera dispar	pinyon rockcress	Dicots	None	None	2B.3	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Joshua tree woodland | Mojavean desert scrub | Pinon & juniper woodlands	Joshua tree woodland, pinyon and juniper woodland, Mojavean desert scrub.	Granitic, gravelly slopes and mesas. Often under desert shrubs which support it as it grows. 1005-2805 m.	The elevation range for this species is above the project site. **This species is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Calochortus striatus	alkali mariposa-lily	Monocots	None	None	1B.2	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden | USFS_S-Sensitive	Chaparral | Chenopod scrub | Meadow & seep | Mojavean desert scrub | Wetland	Chaparral, chenopod scrub, Mojavean desert scrub, meadows and seeps.	Alkaline meadows and ephemeral washes. 70-1600m.	No alkali meadows occur on site. No suitable habitat occurs on site. **This species is not present**.
Cymopterus multinervatus	purple-nerve cymopterus	Dicots	None	None	2B.2		Joshua tree woodland | Mojavean desert scrub	Mojavean desert scrub, pinyon and juniper woodland.	Sandy or gravelly places. 765-2195 m.	This species prefers higher elevations and slopes. **This species is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Erigeron parishii	Parish's daisy	Dicots	Threatened	None	1B.1	SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Limestone | Mojavean desert scrub | Pinon & juniper woodlands	Mojavean desert scrub, pinyon and juniper woodland.	Often on carbonate; limestone mountain slopes; often associated with drainages. Sometimes on grainite. 1050-2245 m.	The elevation range for this species is above the project site. **This species is not present.**
Grusonia parishii	Parish's club-cholla	Dicots	None	None	2B.2		Joshua tree woodland | Mojavean desert scrub | Sonoran desert scrub	Mojavean desert scrub, Sonoran desert scrub, Joshua tree woodland.	Sandy or rocky sites. 840-1600 m.	The elevation range for this species is above the project site. **This species is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Jaffueliobryum raui	Rau's jaffueliobryum moss	Bryophytes	None	None	2B.3		Alpine dwarf scrub | Chaparral | Limestone | Mojavean desert scrub | Sonoran desert scrub	Alpine dwarf scrub, chaparral, Mojavean desert scrub, Sonoran desert scrub.	Dry openings, rock crevices. On dry sandstone or limestone. 425-2015 m.	No rock outcrops occur on site. **This species is not present**.
Linanthus bernardinus	Pioneertown linanthus	Dicots	None	None	1B.2	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Joshua tree woodland | Pinon & juniper woodlands	Joshua tree woodland, pinyon and juniper woodland.	1120-1345 m.	The elevation range for this species is above the project site. **This species is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Linanthus maculatus ssp. maculatus	Little San Bernardino Mtns. linanthus	Dicots	None	None	1B.2	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Desert dunes | Desert wash | Joshua tree woodland | Mojavean desert scrub | Sonoran desert scrub	Desert dunes, Sonoran desert scrub, Mojavean desert scrub, Joshua tree woodland.	Sandy places. Usually in light-colored quartz sand; often in wash or bajada. 135-1220 m.	No dunes occur on site. No suitable habitat occurs on site. **This species is not present.**
Matelea parvifolia	spear-leaf matelea	Dicots	None	None	2B.3	USFS_S-Sensitive	Mojavean desert scrub | Sonoran desert scrub	Mojavean desert scrub, Sonoran desert scrub.	Dry rocky ledges and slopes. 360-1440 m.	The project site is flat. No ledges or slopes occur on site. **This spceis is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Monardella robisonii	Robison's monardella	Dicots	None	None	1B.3	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden	Pinon & juniper woodlands	Pinyon and juniper woodland.	Rocky desert slopes, often among granitic boulders. 610-1615 m.	The project site is flat. No slopes or granitic boulders occur on site. **This spceis is not present.**
Muhlenbergia appressa	appressed muhly	Monocots	None	None	2B.2		Coastal scrub | Mojavean desert scrub | Valley & foothill grassland	Coastal scrub, Mojavean desert scrub, valley and foothill grassland.	Rocky slopes, canyon bottoms. 20-1600 m.	The project site is flat. No slopes or canyons occur on site. **This spceis is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Penstemon clevelandii var. mohavensis	Mojave beardtongue	Dicots	None	None	1B.2		Mojavean desert scrub | Pinon & juniper woodlands	Mojavean desert scrub, pinyon and juniper woodland.	Rocky, granitic (often). 925-1620 m.	The elevation range for this species is above the project site. **This species is not present.**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Saltugilia latimeri	Latimer's woodland-gilia	Dicots	None	None	1B.2	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden | SB_USDA-US Dept of Agriculture | USFS_S-Sensitive	Chaparral | Limestone | Mojavean desert scrub | Pinon & juniper woodlands	Chaparral, Mojavean desert scrub, pinyon and juniper woodland.	Rocky or sandy substrate; sometimes in washes, sometimes limestone. 120-2200 m.	The soils on site did not have any characteristics of limestone. This species prefers desert slopes. No suitable habitat occurs on site. **This species is not present**.

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Sphaeralcea rusbyi var. eremicola	Rusby's desert-mallow	Dicots	None	None	1B.2	BLM_S-Sensitive | SB_CalBG/RSABG-California/Rancho Santa Ana Botanic Garden | SB_USDA-US Dept of Agriculture	Desert wash | Joshua tree woodland | Limestone | Mojavean desert scrub	Mojavean desert scrub, Joshua tree woodland.	In creosote bush scrub, blackbush scrub, Joshua tree woodland; sometimes on carbonate; sometimes in washes. 425-1645 m.	The soils on site do not have any characteristics of limestone. This species is known at higher elevations. According to the Jepson Flora Project the elevation range for this species is 1000-1500 m which is above this sites elevation. **This species is not**

Scientifc Name	Common Name	Taxon Group	Federal List	State List	Rare Plant Rank	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Streptanthus campestris	southern jewelflower	Dicots	None	None	1B.3	BLM_S-Sensitive | SB_CRES-San Diego Zoo CRES Native Gene Seed Bank | USFS_S-Sensitive	Chaparral | Lower montane coniferous forest | Pinon & juniper woodlands	Chaparral, lower montane coniferous forest, pinyon and juniper woodland.	Open, rocky areas. 605-2590 m.	No suitable habitat occurs on site. **This species is not present**.
Wislizenia refracta ssp. refracta	jackass-clover	Dicots	None	None	2B.2		Alkali playa | Desert dunes | Desert wash | Mojavean desert scrub | Sonoran desert scrub	Playas, desert dunes, Mojavean desert scrub, Sonoran desert scrub.	Sandy washes, roadsides, alkaline flats. 380-1160 m.	No alkaline soils occur on site. This shrub was not found during the general bio survey. **This species is not present**.

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Anniella stebbinsi	Southern California legless lizard	Reptiles	None	None	CDFW_SSC-Species of Special Concern | USFS_S-Sensitive	Broadleaved upland forest | Chaparral | Coastal dunes | Coastal scrub	Generally south of the Transverse Range, extending to northwestern Baja California. Occurs in sandy or loose loamy soils under sparse vegetation. Disjunct populations in the Tehachapi and Piute Mountains in Kern County.	Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	No suitable habitat occurs on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Antrozous pallidus	pallid bat	Mammals	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive	Chaparral | Coastal scrub | Desert wash | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Riparian woodland | Sonoran desert scrub | Upper montane coniferous forest | Valley & foothill grassland	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting.	Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	No areas suitable for roosting occur on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Aquila chrysaetos	golden eagle	Birds	None	None	BLM_S-Sensitive | CDF_S-Sensitive | CDFW_FP-Fully Protected | CDFW_WL-Watch List | IUCN_LC-Least Concern	Broadleaved upland forest | Cismontane woodland | Coastal prairie | Great Basin grassland | Great Basin scrub | Lower montane coniferous forest | Pinon & juniper woodlands | Upper montane coniferous forest | Valley & foothill grassland	Rolling foothills, mountain areas, sage-juniper flats, and desert.	Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	No suitable nesting habitats occur on site. **This species is not present**.

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Athene cunicularia	burrowing owl	Birds	None	Candidate Endangered	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Coastal prairie | Coastal scrub | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley & foothill grassland	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation.	Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Suitable habitat for this species occurs on site. **This species has the potential to be present.**
Bombus crotchii	Crotch's bumble bee	Insects	None	Candidate Endangered	IUCN_EN-Endangered		Coastal California east to the Sierra-Cascade crest and south into Mexico.	Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	The food plant genera of this species is not found on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	Mammals	None	None		Desert wash | Pinon & juniper woodlands | Sonoran desert scrub	Desert border areas of San Diego, Riverside, San Bernardino, and Los Angeles counties in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc.	Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	No rock outcrops occur on site. No suitable habitat occurs on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Crotalus ruber	red-diamond rattlesnake	Reptiles	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFS_S-Sensitive	Chaparral | Mojavean desert scrub | Sonoran desert scrub	Chaparral, woodland, grassland, and desert areas from coastal San Diego County to the eastern slopes of the mountains.	Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	The site does not have any rock outcrops and the vegetation consists of open desert scrub. No suitable habitat for this species occurs on site. **This species is not present**.
Eumops perotis californicus	western mastiff bat	Mammals	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern	Chaparral | Cismontane woodland | Coastal scrub | Valley & foothill grassland	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc.	Roosts in crevices in cliff faces, high buildings, trees and tunnels.	No areas suitable for roosting occur on site. **This species is not present**.

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Falco mexicanus	prairie falcon	Birds	None	None	CDFW_WL-Watch List | IUCN_LC-Least Concern	Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley & foothill grassland	Inhabits dry, open terrain, either level or hilly.	Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	No suitable habitat occurs on site. **This species is not present.**
Gopherus agassizii	desert tortoise	Reptiles	Threatened	Threatened	IUCN_CR-Critically Endangered	Joshua tree woodland | Mojavean desert scrub | Sonoran desert scrub	Most common in desert scrub, desert wash, and Joshua tree habitats; occurs in almost every desert habitat.	Require friable soil for burrow and nest construction. Creosote bush habitat with large annual wildflower blooms preferred.	Suitable habitat for desert tortoise occurs on site. **This species has the potential to be present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Lasiurus cinereus	hoary bat	Mammals	None	None	IUCN_LC-Least Concern	Broadleaved upland forest | Cismontane woodland | Lower montane coniferous forest | North coast coniferous forest	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding.	Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	No areas suitable for roosting occur on site. **This species is not present**.
Lasiurus xanthinus	western yellow bat	Mammals	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Desert wash	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats.	Roosts in trees, particularly palms. Forages over water and among trees.	No areas suitable for roosting occur on site. **This species is not present**.

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Myotis thysanodes	fringed myotis	Mammals	None	None	BLM_S-Sensitive | IUCN_LC-Least Concern | USFS_S-Sensitive		In a wide variety of habitats, optimal habitats are pinyon-juniper, valley foothill hardwood and hardwood-conifer.	Uses caves, mines, buildings or crevices for maternity colonies and roosts.	No suitable habitat occurs on site. **This species is not present.**
Nyctinomops femorosaccus	pocketed free-tailed bat	Mammals	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Joshua tree woodland | Pinon & juniper woodlands | Riparian scrub | Sonoran desert scrub	Variety of arid areas in Southern California; pine-juniper woodlands, desert scrub, palm oasis, desert wash, desert riparian, etc.	Rocky areas with high cliffs.	No suitable habitat occurs on site. **This species is not present.**
Nyctinomops macrotis	big free-tailed bat	Mammals	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern		Low-lying arid areas in Southern California.	Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.	No suitable habitat occurs on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Ovis canadensis nelsoni	desert bighorn sheep	Mammals	None	None	BLM_S-Sensitive | CDFW_FP-Fully Protected | USFS_S-Sensitive	Alpine | Alpine dwarf scrub | Chaparral | Chenopod scrub | Great Basin scrub | Mojavean desert scrub | Montane dwarf scrub | Pinon & juniper woodlands | Riparian woodland | Sonoran desert scrub	Widely distributed from the White Mtns in Mono Co. to the Chocolate Mts in Imperial Co.	Open, rocky, steep areas with available water and herbaceous forage.	No suitable habitat occurs on site. **This species is not present.**
Paranomada californica	California cuckoo bee	Insects	None	None					No suitable habitat occurs on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Phrynosoma blainvillii	coast horned lizard	Reptiles	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Chaparral | Cismontane woodland | Coastal bluff scrub | Coastal scrub | Desert wash | Pinon & juniper woodlands | Riparian scrub | Riparian woodland | Valley & foothill grassland	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Suitable habitat for this species occurs on site. **This species has the potential to be present.**
Setophaga petechia	yellow warbler	Birds	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Riparian forest | Riparian scrub | Riparian woodland	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada.	Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	No suitable habitat occurs on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Taxidea taxus	American badger	Mammals	None	None	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Alkali marsh | Alkali playa | Alpine | Alpine dwarf scrub | Bog & fen | Brackish marsh | Broadleaved upland forest | Chaparral | Chenopod scrub | Cismontane woodland | Closed-cone coniferous forest | Coastal bluff scrub | Coastal dunes | Coastal prairie | Coastal scrub | Desert dunes | Desert wash | Freshwater marsh | Great Basin grassland |	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	No suitable habitat occurs on site. **This species is not present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Toxostoma bendirei	Bendire's thrasher	Birds	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFWS_BCC-Birds of Conservation Concern	Joshua tree woodland | Mojavean desert scrub	Migratory; local spring/summer resident in flat areas of desert succulent shrub/Joshua tree habitats in Mojave Desert.	Nests in cholla, yucca, palo verde, thorny shrub, or small tree, usually 0.5 to 20 feet above ground.	Suitable habiat occurs on site. **This species has the potential to be present.**
Toxostoma lecontei	Le Conte's thrasher	Birds	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Desert wash | Mojavean desert scrub | Sonoran desert scrub	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats.	Commonly nests in a dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.	Suitable habiat occurs on site. **This species has the potential to be present.**

Scientific Name	Common Name	Taxon Group	Federal List	State List	Other Status	Habitats	General Habitat	Microhabitat	Presence/ Absence
Uma scoparia	Mojave fringe-toed lizard	Reptiles	None	None	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Desert dunes | Desert wash | Mojavean desert scrub	Fine, loose, wind-blown sand in sand dunes, dry lakebeds, riverbanks, desert washes, sparse alkali scrub and desert scrub.	Shrubs or annual plants may be necessary for arthropods found in the diet.	Suitable habiat occurs on site. **This species has the potential to be present.**
Vireo bellii pusillus	least Bell's vireo	Birds	Endangered	Endangered		Riparian forest | Riparian scrub | Riparian woodland	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft.	Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite.	No suitable habitat occurs on site. **This species is not present.**

APPENDIX C

View of creosote bush scrub onsite followed by Broadway Street. View looking northwest.

Creosote bush scrub habitat on site where impacts will occur. View looking southwest.

Disturbed habitat in the northeast corner of site at the intersection of E Broadway Street and Sunever Road. View looking north.

Hernandez Environmental Services

View of ephemeral stream on site. View looking southwest.

Creosote bushes (*Larrea tridentata*) on site where impacts will occur followed by La Ferney Avenue and residential area to the west. View looking west.

View of western Joshua tree (*Yucca brevifolia*) on site. View looking east.

Hernandez Environmental Services

PRELIMINARY JURISDICTIONAL WATER DELINEATION

JOSHUA TREE, SAN BERNARDINO COUNTY, CALIFORNIA
APN: 0605-051-01

Prepared for:

JT Santorini Villa LLC
1751 Colorado Boulevard, Suite 333
Los Angeles, California 90041

Prepared by:

RCA Associates, Inc.
15555 Main St. #D4-235
Hesperia, California 92345
(760) 596-0017; (760) 956-9212

Principal Investigator:
Ryan D. Hunter, Principal Environmental Scientist & Wildlife Biologist
Brian S. Bunyi, Environmental Scientist, Wildlife Biologist

Project #2026-77 JD

April 26, 2026

TITLE PAGE

Date Report Written:	**April 26, 2026**
Date Field Work Completed:	**April 15 & 22, 2026**
Report Title:	**Jurisdictional Waters Delineation**
Assessor's Parcel Number:	**0605-051-01**
Prepared for:	**JT Santorini Villa LLC** **1751 Colorado Boulevard, Suite 333** **Los Angeles, California 90041**
Principal Investigators:	**Ryan D. Hunter,** **Principal Environmental Scientist & Wildlife Biologist** **Brian Bunyi,** **Environmental Scientist & Wildlife Biologist**
Contact Information:	**Ryan D. Hunter** **RCA Associates, LLC** **15555 Main Street, #D4-235** **Hesperia, CA 92345** **(760) 956-9212** **rhunter@rcaassociatesinc.com** **www.rcaassociatesinc.com** **Brian S. Bunyi** **RCA Associates, LLC** **15555 Main Street, #D4-235** **Hesperia, CA 92345** **(760) 998-7165** **bbunyi@rcaassociatesinc.com** **www.rcaassociatesinc.com**

Table of Contents

Executive Summary 1

1.0 Introduction 2
- 1.1 Property Description 2
- 1.2 Project Description 3
- 1.3 Regulatory Overview 3
  - 1.3.1 U.S. Army Corps of Engineers 4
  - 1.3.2 Regional Water Quality Control Board (RWQCB) 4
  - 1.3.3 California Department of Fish and Wildlife (CDFW) 4

2.0 Delineation Methodology 4
- 2.1 Literature Review 5
- 2.2 Field Surveys 5
- 2.3 Potential Waters of the US 6

3.0 Delineation Results 7
- 3.1 Jurisdictional Determination 10
  - 3.1.1 U.S. Army Corps of Engineers Jurisdictional Determination 10
  - 3.1.2 Regional Water Quality Control Board Determination 11
  - 3.1.3 California Department of Fish and Wildlife Determination 12
- 3.2 US Army Corps of Engineers Permits 12
- 3.3 Regional Water Quality Control Board 13
- 3.4 California Department of Fish and Wildlife 13
- 3.5 Potential State and Regulatory Considerations 13

4.0 Conclusion and Recommendations 14

5.0 References 16

Appendix A - Figures

EXECUTIVE SUMMARY

RCA Associates, Inc. conducted a Jurisdictional Delineation for the approximately 80.2-acre project site identified as APN 0605-051-01 (Tract No. 20668) in unincorporated San Bernardino County, California. The purpose of the delineation was to identify and map drainage features occurring within the project site and evaluate whether those features may be subject to regulatory oversight by the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or California Department of Fish and Wildlife (CDFW).

Field investigations identified two ephemeral drainage features (Feature 1 and Feature 2) within the project site, including associated secondary distributary flow paths, localized braided drainage zones, and diffuse sheet flow areas. Due to the arid ephemeral nature of the drainage system, ordinary high water mark (OHWM) indicators and channel expression were locally weak or discontinuous in portions of the site; therefore, mapped drainage limits reflect the extent of observable and defensible field indicators identified during the delineation. Approximate top of bank limits were interpreted where observable using multiple geomorphic indicators where continuous bank expression was absent.

Approximate top of bank mapping identified approximately 3.90 acres associated with Feature 1, an estimated 1.01 acres associated with secondary distributary flow paths connected to Feature 1, and approximately 39,499.7 square feet (0.91 acre) associated with Feature 2, for a total mapped and estimated drainage area of approximately 5.82 acres on site.

Based on the jurisdictional evaluation presented in this report, no Waters of the United States subject to federal jurisdiction under Section 404 of the Clean Water Act were identified within the project site based on this delineation. However, mapped drainage features may warrant consideration as potential Waters of the State subject to RWQCB review and as potential streambed resources subject to CDFW review.

Based on these findings, federal permitting from USACE is not anticipated based on this delineation. However, if impacts to mapped drainage features cannot be avoided, consultation with RWQCB and/or CDFW may be warranted to confirm permitting requirements, if any, associated with proposed impacts.

This delineation represents the professional opinion of RCA Associates, Inc. based on site-specific field observations and currently applicable regulatory criteria. Final jurisdictional determinations remain subject to agency review and concurrence.

1.0 INTRODUCTION

As part of the environmental process, a jurisdictional delineation (JD) was deemed necessary to evaluate the presence and extent of mapped drainage features and whether potential jurisdictional resources occur within the project site. The purpose of this jurisdictional delineation was to determine the location and size of any areas that may be defined as waters of the State (WOS) and waters of the U.S. (WOTUS), and to identify the centerline of any jurisdictional areas. The data collected during the field investigation for this JD was used to evaluate the presence and extent of mapped drainage features and whether potential jurisdictional resources occur within the project site. The following sections provide a summary of the data collected and the analysis performed for the proposed project.

1.1 PROPERTY DESCRIPTION

The approximately 80.2-acre project site is located in unincorporated community of Joshua Tree, San Bernardino County, California, and consists of Assessor's Parcel Number (APN 0605-051-01). The property is situated generally near the southeast corner of East Broadway and La Ferney Avenue, with frontage also associated with Sunever Road, Delaware Avenue, California Avenue, and Arizona Avenue. The site is located within Section 20, Township 1 North, Range 7 East, San Bernardino Meridian, within the Joshua Tree North Quadrangle (see Figure 1).

The project site consists of vacant desert land characterized predominantly by creosote bush scrub habitat with gently sloping topography and elevations ranging from approximately 2,473 to 2,523 feet above mean sea level. An ephemeral desert drainage system traverses the property and includes a primary drainage feature, minor secondary distributary flow paths, and localized braided and diffuse flow areas as documented during field investigations. Residential development occurs adjacent to portions of the site, with additional vacant desert lands occurring in the surrounding area. The project site and surrounding vicinity are shown in Figure 2.

1.2 PROJECT DESCRIPTION

The proposed project consists of subdivision of the approximately 80.2 -acre site into 32 residential lots ranging from approximately 2.0 to 2.6 acres, with associated internal roadways, utility infrastructure, drainage improvements, and related appurtenant features. Approximately 10.0 acres of the site are designated for right-of-way dedication associated with existing and proposed streets.

Preliminary plans indicate the project has been designed to avoid alteration of mapped drainage features to the extent practicable. An ephemeral drainage system crossing portions of the property was evaluated as part of this Jurisdictional Delineation relative to the proposed development footprint.

Construction is anticipated to occur in three phases beginning in 2026. Rough grading is planned to include approximately 13,077 cubic yards of cut and 27,320 cubic yards of fill, with an estimated net import of 14,243 cubic yards.

The jurisdictional delineation was reviewed in consideration of the currently available Tentative Tract Map and civil drainage study to evaluate the relationship between mapped drainage features and the conceptual site design. Final evaluation of any project-related impacts would depend upon final grading, utility, and drainage improvement plans.

1.3 REGULATORY OVERVIEW

Activities within streams, wetlands, and riparian areas may be subject to regulation by federal, state, and regional agencies. The U.S. Army Corps of Engineers (USACE) regulates discharges of dredged or fill material into Waters of the United States (WOTUS), including wetlands, pursuant to Section 404 of the Clean Water Act. The California Department of Fish and Wildlife (CDFW) regulates activities that substantially divert or obstruct the natural flow, or that substantially change the bed, channel, or bank of a river, stream, or lake pursuant to Fish and Game Code Section 1602. The Regional Water Quality Control Board (RWQCB) regulates discharges to Waters of the United States under Section 401 of the Clean Water Act and discharges to Waters of the State pursuant to the California Porter-Cologne Water Quality Control Act.

1.3.1 U.S. ARMY CORPS OF ENGINEERS (USACE)

The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged or fill material into Waters of the United States (WOTUS) pursuant to Section 404 of the Clean Water Act. USACE responsibilities include issuing permits and conducting jurisdictional determinations. The scope of federal jurisdiction has been influenced by U.S. Supreme Court decisions, including Rapanos v. United States (2006), Carabell v. United States Army Corps of Engineers (2006), and Sackett v. Environmental Protection Agency (2023). These decisions provide guidance for evaluating whether aquatic features may be subject to federal jurisdiction. This framework was applied in the assessment of aquatic resources within the project site.

1.3.2 REGIONAL WATER QUALITY CONTROL BOARD (RWQCB)

Waters of the State are defined by the California Water Code as any surface water or groundwater, including saline waters, within the boundaries of the State of California (California Water Code §13050[e]). This definition is broader than the federal Clean Water Act definition of Waters of the United States (WOTUS), and may include aquatic features that are not subject to federal jurisdiction. As such, the RWQCB may regulate discharges to WOS pursuant to the Porter-Cologne Water Quality Control Act.

1.3.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)

The California Department of Fish and Wildlife (CDFW) regulates certain activities that may substantially divert or obstruct the natural flow, or substantially change the bed, channel, or bank of a river, stream, or lake pursuant to Section 1602 of the California Fish and Game Code. These activities may require a Lake or Streambed Alteration Agreement (LSAA).

The extent of CDFW jurisdiction is determined on a site-specific basis and is typically associated with the bed or banks of stream channels and, where present, adjacent riparian vegetation.

2.0 DELINEATION METHODOLOGY

A jurisdictional delineation was conducted to evaluate drainage features occurring within the project site and to assess whether those features may be subject to regulatory oversight by the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or California Department of Fish and

Wildlife (CDFW). The delineation focused on identifying and mapping observable drainage features and associated indicators consistent with potential jurisdictional resources in an arid ephemeral drainage setting.

The delineation was performed using a combination of literature review, field investigation, and field mapping of observable geomorphic and hydrologic indicators. Methods were generally guided by the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual; the Arid West Regional Supplement (2008); and arid West ordinary high water mark guidance described by Lichvar and McColley 2008, as applicable to evaluation of ephemeral drainage features.

Drainage features were assessed in the field based on observable indicators including, but not limited to, ordinary high water mark (OHWM) indicators, localized bed and bank expression where present, sediment sorting, scour, depositional features, and breaks in slope. Because portions of the site exhibit multiple interlaced distributary flow paths and areas of diffuse sheet flow, field mapping focused on delineating defensible feature boundaries where observable indicators supported mapping and recognizing braided drainage zones or diffuse flow areas where continuous channel expression was absent.

Field-mapped drainage features and associated boundaries were recorded using a Juniper Systems Cedar CT8X2 GPS tablet and incorporated into project figures included in Appendix A.

2.1 LITERATURE REVIEW

A review of available background information was conducted prior to field investigations and included aerial imagery and topographic mapping. Available soils information was reviewed to the extent applicable to evaluation of arid drainage features; however, delineation of mapped drainage features was based primarily on observable geomorphic and hydrologic indicators rather than hydric soil indicators. Existing project plans, including the tentative tract map and rough grading plans provided by the applicant, were also reviewed to understand existing site conditions and the relationship of mapped drainage features to the proposed development layout.

2.2 FIELD SURVEYS

Field investigations were conducted to identify and map drainage features and evaluate observable indicators of OHWM, channel form, and associated geomorphic characteristics. Field investigations were conducted under dry conditions typical of the region. Drainage features were walked in the field and mapped based on defensible

indicators observed during the site visit. In portions of the site where multiple small channels split and rejoin or where flow transitions into diffuse sheet flow, features were mapped as braided drainage zones, secondary distributary flow paths, or diffuse sheet flow areas, as appropriate, rather than forcing continuous channel boundaries where indicators were weak or discontinuous. Representative photo documentation locations collected during field investigations are shown in Figure 7.

2.3 POTENTIAL WATERS OF THE U.S.

Federal jurisdiction over non-wetland Waters of the United States (WOTUS) generally extends to the ordinary high-water mark (OHWM). The OHWM is defined in 33 CFR §328.3 as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris.

In the Arid West region of the United States, hydrologic conditions are highly variable, and drainage features commonly consist of ephemeral, intermittent, and perennial channel forms. Ordinary high-water mark delineations in arid environments are often challenging due to the episodic nature of flow events and the transient expression of traditional OHWM indicators.

Hydrology, channel-forming processes, and the distribution of OHWM indicators in desert environments are strongly influenced by climatic conditions, which can complicate delineation efforts. In low-gradient, alluvial ephemeral and intermittent channels, the OHWM is often associated with the active floodplain. As noted by Lichvar and McColley (2008), the dynamic nature of arid-region channels and the transient character of many traditional OHWM indicators may limit the reliability of individual indicators; therefore, the active floodplain is often considered one of the most consistent and repeatable features for OHWM interpretation in these environments. This conclusion is supported by subsequent research examining vegetation and channel morphology responses to ordinary high-water discharge events in arid-region stream channels (Lichvar et al. 2009).

The boundaries of drainage features within the project site were identified based on field investigations conducted by RCA Associates, Inc. The OHWM was interpreted using a combination of geomorphic, hydrologic, and vegetative indicators observed along channel banks and within channel beds. OHWM indicators were documented in most areas of the channels. During the surveys, vegetation characteristics and substrate

composition were evaluated, and the limits of the OHWM were walked and recorded using GPS. Spatial data were compiled into a Keyhole Markup Language (KML), and mapped drainage features are presented in Figures 3, 4 and 5.

3.0 DELINEATION RESULTS

Field investigations identified two ephemeral drainage features within the project site (Feature 1 and Feature 2) exhibiting characteristics associated with desert wash systems. Both features were evaluated based on observable geomorphic and hydrologic indicators, including ordinary high water mark (OHWM) indicators, localized bed and bank expression where present, sediment sorting, scour, and other indicators consistent with arid ephemeral drainage systems. No wetlands were identified within the project site. No riparian vegetation communities were identified within the mapped drainage features. Feature 1, including associated braided drainage zones, secondary distributary flow paths, and diffuse sheet flow areas, is shown in Figure 4.

FEATURE 1

Feature 1 consists of the primary drainage feature on site and trends generally northeast across the project site. The feature exhibits variable morphology, with approximate widths ranging from 12 to 40 feet, reflecting localized channel confinement, distributary branching, and broader braided drainage conditions. The feature exhibits a definable channel in many areas supported by observable OHWM indicators; however, due to the ephemeral desert setting, channel morphology and OHWM indicators become weak or discontinuous in portions of the drainage where multiple interlaced distributary flow paths split and rejoin. These areas were characterized as a braided drainage zone where the drainage functions as a composite system rather than as a single continuously confined channel.

Several secondary distributary flow paths branch eastward from Feature 1 toward Sun Ever Road. These minor flow paths exhibit localized erosional expression and intermittent OHWM indicators in places, but lose definable channel morphology and dissipate into diffuse sheet flow near the roadway. These distributary flow paths were mapped only where defensible geomorphic indicators were present and were not treated as separate primary drainage features.

Secondary distributary flow paths associated with Feature 1 are generally shallow (approximately several inches to one foot in depth), exhibit localized and intermittent geomorphic expression, and were mapped as associated flow paths rather than separate primary drainage features. These flow paths were evaluated as components of

the broader Feature 1 drainage system and were not treated as independent drainage features. Representative field conditions associated with mapped drainage features are documented in Figure 7.

Estimated distributary flow path area reflects only those secondary flow paths exhibiting sufficient lateral expression to support a representative width estimate; minor diffuse or poorly expressed flow threads were not included. Additional minor flow traces and shallow runoff threads were observed in portions of the site; however, where such features lacked sufficient geomorphic expression, definable connectivity to mapped drainage features, or dissipated into diffuse sheet flow without a defensible channel form, were not mapped as drainage features.

Treatment of Diffuse Sheet Flow Areas

A diffuse sheet flow area was identified in the eastern portion of the site in the vicinity of Sunever Road, extending both on-site and off-site, where drainage associated with secondary distributary flow paths becomes laterally dispersed and transitions into broad sheet flow across a roadway-influenced surface. This area was depicted on the figures to illustrate general surface water movement and hydrologic transition between more defined mapped drainage segments; however, it was not mapped as a separate jurisdictional drainage feature and was not included in the jurisdictional acreage summary table.

Field indicators within the diffuse sheet flow area, including ordinary high water mark characteristics, bed and bank expression, sediment sorting, and other channel morphology indicators, were weak, intermittent, or discontinuous and did not support delineation of a discrete channel feature with reasonably defined lateral limits. Flow in this area appeared to dissipate and spread across a broad sheet flow expression associated in part with the roadway corridor, rather than maintain sufficient continuity to support mapping as a separate drainage feature for jurisdictional accounting purposes.

Accordingly, the diffuse sheet flow area is shown for hydrologic context only to illustrate the transition of surface runoff through the Sunever Road area and between mapped drainage segments, but was not quantified as a separate jurisdictional feature in Table 1.

FEATURE 2

Feature 2 consists of a minor ephemeral drainage located in the northwestern portion of the project site. Feature 2 exhibits localized channel form and intermittent OHWM indicators, although drainage expression is weaker and less continuous than Feature 1. Feature 2 was mapped separately where field indicators supported a

defensible drainage boundary. Channel widths ranged from approximately 3 to 14 feet, with depths varying from several inches to approximately 3 feet. Feature 2 is shown in Figure 5

Mapped drainage limits shown on project figures reflect the extent of observable and defensible field indicators and do not assume continuous OHWM or top of bank boundaries where such indicators were absent. Acreage estimates for both mapped features are shown below.

Table 1: Estimated Acreages Based of Delineated Features

Feature	**Mapping Basis**	**Total Area (acres)**
Feature 1	Approximate Top of Bank	3.90 acres
Secondary Distributary Flow Paths associated with Feature 1	Estimated from mapped centerlines and representative widths	1.01 acres
Feature 2	Approximate Top of Bank	0.91 acres
Total Mapped/Estimated Drainage Area	Combined total	5.82 acres

Note: Areas are based on mapped drainage feature limits of Feature 1/2 and the project boundary. On-site acreages reflect the best professional interpretation of mapped drainage feature limits within the project boundary and are subject to final agency concurrence.

Relationship with Current Drainage Study

Review of the currently available civil drainage study indicates the project is intended to generally maintain the existing drainage pattern through preservation of primary drainage corridors, conveyance of tributary flows through planned crossings, and incorporation of drainage improvements designed to minimize disruption of existing flow paths. Based on the currently available information, mapped drainage features identified in this delineation appear capable of being incorporated into the conceptual site design, although final evaluation of whether proposed road crossings, culverts, detention facilities, grading, or drainage improvements may affect mapped features would require review of final engineering plans. Similarly, any alteration of existing sheet flow or mapped secondary distributary flow paths, if proposed, would require further evaluation during final design.

The drainage study also indicates no mapped blue-line stream courses occur within the project boundary, which is consistent with the delineation's conclusion that no federal jurisdictional waters subject to USACE Section 404 are present.

The relationship between mapped drainage features and the current conceptual site design is depicted on Figure 6, which overlays the delineated features onto the latest Tentative Tract Map and illustrates the relationship between Features 1 and 2, associated secondary distributary flow paths, and proposed project improvements. Figure 6 is intended to provide a planning-level understanding of how mapped drainage features relate to the current project layout. Final evaluation of the relationship between proposed grading, road crossings, utilities, and drainage improvements relative to mapped features will require review of final engineering plans.

3.1 PRELIMINARY JURISDICTIONAL DETERMINATION

3.1.1 U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION

A jurisdictional evaluation was conducted to assess whether the mapped drainage features identified on the project site qualify as Waters of the United States (WOTUS) under the authority of the U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act.

Two ephemeral drainage features (Feature 1 and Feature 2) were identified within the project site. These features exhibit localized ordinary high water mark (OHWM) indicators and channel characteristics in portions of the site, including localized scour, sediment sorting, depositional features, and intermittent bed and bank expression where present. Portions of Feature 1 include secondary distributary flow paths, braided drainage zones, and diffuse sheet flow areas where OHWM indicators become weak or discontinuous and a single continuous OHWM boundary could not be reliably traced.

Based on field observations, both mapped features function as ephemeral desert drainages that convey stormwater runoff during precipitation events. However, neither Feature 1 nor Feature 2 exhibited relatively permanent flow, standing water, wetlands, or evidence of a continuous surface connection to a traditionally navigable water or other relatively permanent waterbody. Consistent with the interpretation of Waters of the United States following Sackett v. EPA, and based on site-specific field observations, the mapped drainage features do not appear to meet the criteria for federal jurisdiction as Waters of the United States. Accordingly, no jurisdictional waters subject to Section 404 of the Clean Water Act were identified within the project site based on this delineation.

Review of aerial imagery, topographic mapping, and available National Hydrography Dataset information indicates the mapped ephemeral drainage features do not exhibit a continuous surface connection to a relatively permanent waterbody. Flow from the site dissipates through ephemeral desert drainage conditions and does not support federal jurisdiction under the post-Sackett framework.

This assessment represents the professional opinion of RCA Associates, Inc. based on field observations and currently applicable regulatory criteria. Final jurisdictional determinations remain subject to USACE review and concurrence.

3.1.2 REGIONAL WATER QUALITY CONTROL BOARD DETERMINATION

A jurisdictional evaluation was conducted to assess whether the mapped drainage features identified within the project site may qualify as Waters of the State subject to regulatory authority of the Regional Water Quality Control Board (RWQCB) under the Porter-Cologne Water Quality Control Act.

Two ephemeral drainage features (Feature 1 and Feature 2) were identified within the project site, including associated secondary distributary flow paths, localized braided drainage zones, and diffuse sheet flow areas associated with Feature 1. These features exhibit observable drainage characteristics in portions of the site, including localized channel morphology, sediment transport indicators, and ordinary high water mark (OHWM) indicators, although such indicators become weak or discontinuous in some areas.

Although the mapped features do not appear to meet criteria for Waters of the United States, ephemeral drainage features may nonetheless be subject to RWQCB authority as Waters of the State where a drainage feature exhibits sufficient evidence of a surface water feature or conveyance subject to state jurisdiction.

Based on field observations, the mapped drainage features may be considered potential Waters of the State subject to RWQCB review and concurrence. Final determination regarding applicability of state jurisdiction remains subject to RWQCB interpretation.

3.1.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE DETERMINATION

A jurisdictional evaluation was conducted to assess whether the mapped drainage features identified within the project site may be subject to jurisdiction by the California Department of Fish and Wildlife (CDFW) pursuant to California Fish and Game Code Sections 1600–1616.

Two ephemeral drainage features (Feature 1 and Feature 2) were identified within the project site, including associated secondary distributary flow paths, localized braided drainage zones, and diffuse sheet flow areas associated with Feature 1. Both features exhibit observable drainage characteristics in portions of the site, including localized bed and bank expression where present, sediment transport indicators, scour, and ordinary high water mark (OHWM) indicators.

Because continuous and well-defined bank features were not present throughout all portions of the drainage system, approximate top of bank limits were interpreted and mapped where observable based on multiple geomorphic indicators, including breaks in slope, channel morphology, scour patterns, sediment deposition, and associated field evidence, rather than solely where sharply defined banks were present. In portions of braided drainage or diffuse sheet flow where a continuous bank margin could not be reliably identified, top of bank was not forced where unsupported by field indicators. Approximate top of bank mapping is depicted in Figures 4 and 5.

Based on field observations, the mapped drainage features may warrant consideration as potential streambed resources subject to CDFW review and possible jurisdiction pursuant to Fish and Game Code Sections 1600–1616. Final determination regarding the extent and applicability of CDFW jurisdiction remains subject to agency review and concurrence.

3.2 US ARMY CORPS OF ENGINEERS PERMITS

Based on the field observations and jurisdictional evaluation presented in Section 3.1.1, a permit under Section 404 of the Clean Water Act from the U.S. Army Corps of Engineers (USACE) is not anticipated because no Waters of the United States were identified within the project site based on this delineation. Final confirmation remains subject to USACE review and concurrence.

3.3 REGIONAL WATER QUALITY CONTROL BOARD

Based on the field observations and jurisdictional evaluation presented in Section 3.1.2, the mapped drainage features may warrant consideration as potential Waters of the State subject to review by the Regional Water Quality Control Board (RWQCB). If impacts to features determined by RWQCB to be Waters of the State cannot be avoided, authorization under the Porter-Cologne Water Quality Control Act, which may include Waste Discharge Requirements or other applicable authorization, may be required. Final applicability remains subject to RWQCB review and concurrence.

3.4 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Based on the field observations and jurisdictional evaluation presented in Section 3.1.3, the mapped drainage features may warrant consideration as potential streambed resources subject to review by the California Department of Fish and Wildlife (CDFW). If impacts to features determined by CDFW to be jurisdictional cannot be avoided, authorization pursuant to Fish and Game Code Sections 1600–1616, including a Lake or Streambed Alteration Agreement, may be required. Final applicability remains subject to CDFW review and concurrence.

3.5 POTENTIAL STATE REGULATORY CONSIDERATIONS

Based on currently available plans, it cannot yet be confirmed whether all mapped drainage features identified in this delineation would be fully avoided by final project improvements. If final project design demonstrates complete avoidance of mapped drainage features, separate authorization from CDFW or RWQCB may not be required beyond documentation of avoidance and implementation of protective measures during construction. However, if proposed grading, infrastructure, roadway crossings, or drainage improvements result in impacts to mapped streambed resources or RWQCB-regulated Waters of the State, consultation with CDFW regarding Fish and Game Code Section 1602 and consultation with RWQCB regarding potential Waste Discharge Requirements or other applicable authorization may be warranted prior to grading. Final permitting applicability would depend on final project design, impact footprint, and agency concurrence.

4.0 CONCLUSION AND RECOMMENDATIONS

Based on field observations, desktop review, and application of the 1987 Corps of Engineers Wetlands Delineation Manual, the Arid West Regional Supplement, and applicable regulatory criteria, two drainage features (Feature 1 and Feature 2), including associated secondary distributary flow paths where mapped, were identified on the Project site as potentially subject to state jurisdiction under the Porter-Cologne Water Quality Control Act and/or California Fish and Game Code Sections 1600 et seq. The delineated features do not exhibit a continuous surface connection to a relatively permanent waterbody and therefore do not satisfy criteria for federal jurisdiction under the post-*Sackett* framework; accordingly, no federal jurisdictional waters subject to USACE Section 404 are anticipated.

Based on currently available information, final permitting applicability associated with the mapped drainage features, if any, would depend on final project design, the relationship of proposed improvements to mapped features, and agency concurrence, as applicable.

Recommended Avoidance and Minimization Measures

To support project planning, CEQA review, and avoidance of potential impacts to mapped drainage features, the following measures are recommended for consideration during final engineering and construction planning:

1. Mapped drainage features should be shown on final grading, utility, roadway, and drainage improvement plans.
2. Grading, fill, equipment staging, and material stockpiling should be avoided within mapped drainage features unless specifically evaluated and, if applicable, authorized.
3. Protective fencing, flagging, or other construction exclusion measures should be installed where necessary to identify limits of avoidance adjacent to mapped features.
4. Final project design should, to the extent feasible, maintain existing drainage conveyance and natural drainage function associated with mapped features.
5. If temporary disturbances to mapped features are proposed or unavoidable, disturbed areas should be restored to pre-project contours and stabilized where feasible, consistent with final design requirements and any applicable agency conditions.
6. Appropriate erosion and sediment control Best Management Practices (BMPs) should be implemented during construction to avoid sedimentation or inadvertent discharge into mapped drainage features.

7. If final engineering design indicates potential impacts to mapped drainage features, additional evaluation may be warranted to assess whether agency consultation or authorization may be applicable prior to grading.

This delineation represents professional conclusions based on conditions observed at the time of field investigation and information available at the time of preparation. If site conditions, project design, or applicable regulatory criteria change, additional evaluation may be warranted.

5.0 REFERENCES

Hickman, James C., (ed.). 1993. The Jepson Manual: Higher Plants of California. Berkeley: University of California Press.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Game (Sacramento), Nongame Heritage Program Report.

Hurt, G.W., and L.M. Vasilas (eds.). 2006. Field Indicators of Hydric Soils in the United States, Version 6.0. United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with the National Technical Committee for Hydric Soils.

Lichvar, R.W., and S.M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Army Engineer Research and Development Center. ERDC/CRREL TR-08-12.

Lichvar, R.W., B. Allen, J. Byersdorfer, D. Cate, L. Dixon, and C. Photos. Vegetation and Channel Morphology Responses to Ordinary High Water Discharge Events in Arid West Stream Channels. U.S. Army Engineer Research and Development Center. ERDC/CRREL TR-09-5.

Planert, M., and J.S. Williams. 1995. Ground Water Atlas of the United States, California, Nevada, HA 730-B-Basin and Range Aquifers. United States Geological Survey. Available at: http://capp.water.usgs.gov/gwa/ch_b/index.html.

United States Army Corps of Engineers (USACE). 1987. Wetlands Delineation Manual-Technical Report Y-87-1 (online edition). U.S. Army Corps of Engineers Waterways Experiment Station.

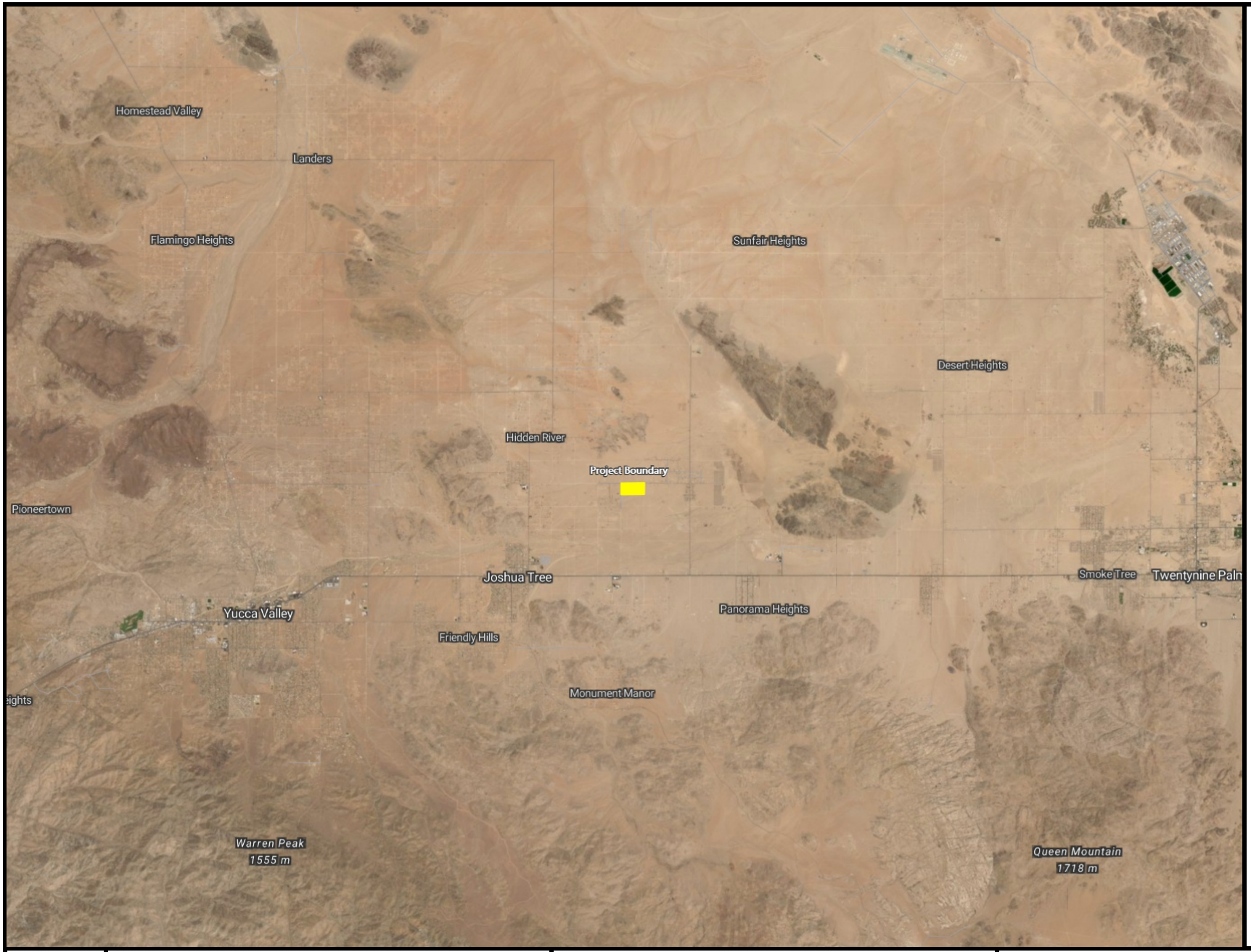
United States Army Corps of Engineers (USACE). 2007. Jurisdictional Delineation Form Instructional Guidebook. Available at: httP://www.usace.army.mil/CECW/Pages/home.aspx.

United States Army Corps of Engineers (USACE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 U.S. Army Engineer Research and Development Center. ERDC/EL TR-08-28.

Western Regional Climate Center (WRCC). 2010. Palm Springs, California (046635). Available at: http://www.wrcc.dri.edu/.

APPENDIX A

Figures



Legend

Project Boundary

Figure 1: Regional Exhibit

Produced By: RCA Associates Inc.

APN 0605-051-01

Source:	Uinta Software
Acreage:	80.2-acres (Approximately)
Project #:	2026-77

RCA EST. 1990 ASSOCIATES, INC

Legend

Project Boundary

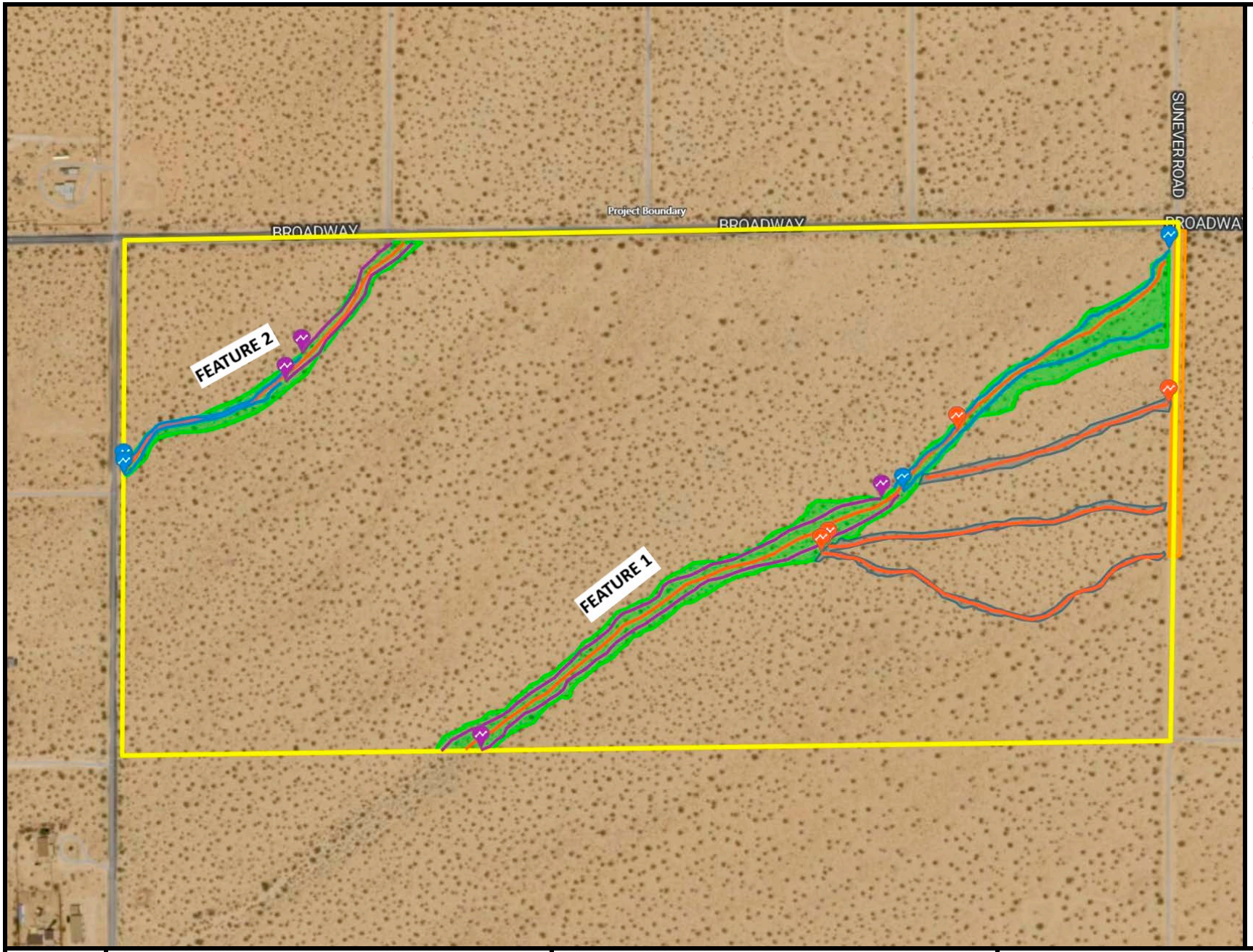
Figure 2: Vicinity Exhibit

Produced By: RCA Associates Inc.

APN 0605-051-01

Source:	Uinta Software
Acreage:	80.2-acres (Approximately)
Project #:	2026-77

RCA EST. 1990 ASSOCIATES, INC



Legend

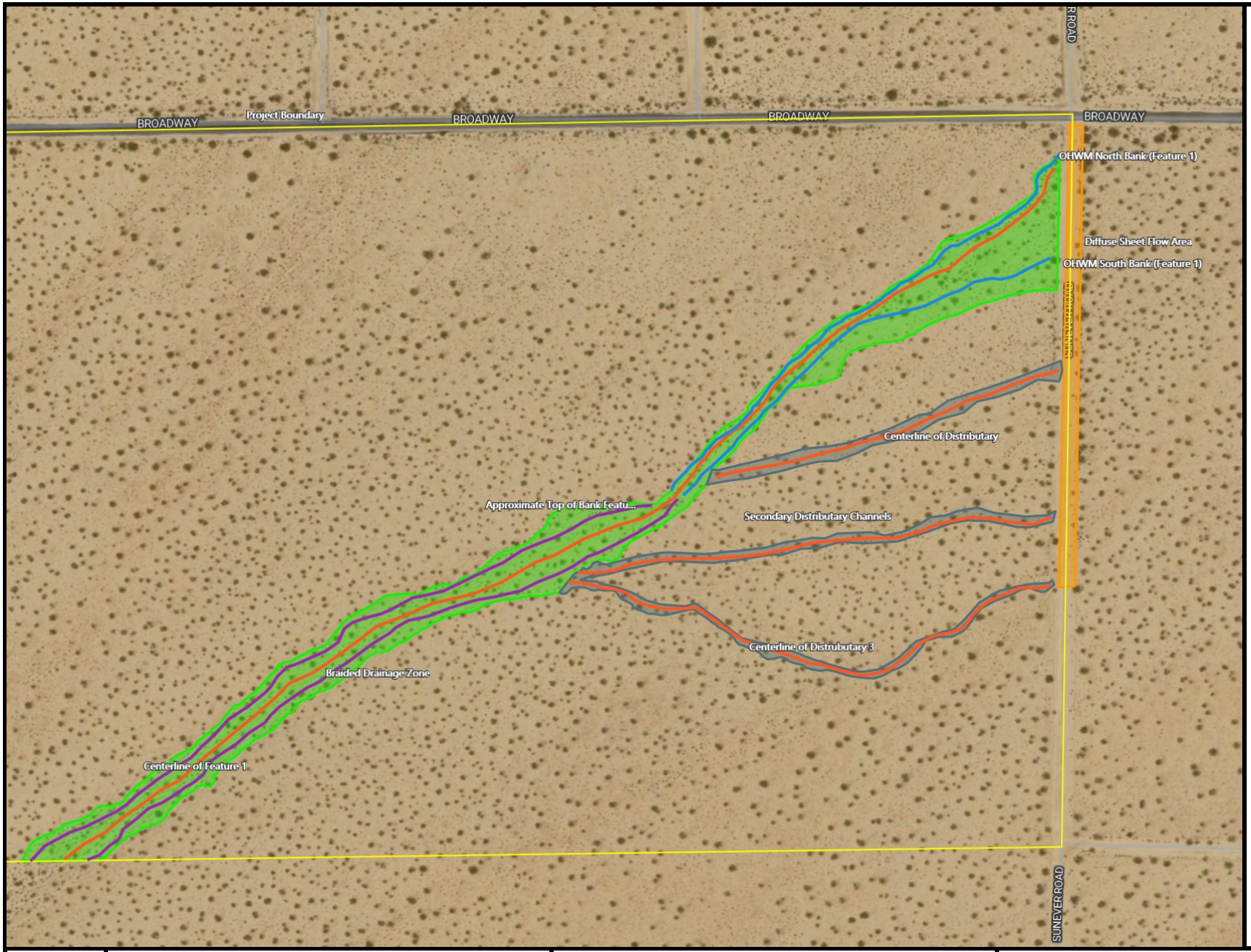
- Approximate Top of Bank
- Braided Drainage Zone
- Centerline of Channel
- OHWM
- Project Boundary
- Secondary Distributary Flow Paths

Figure 3: Feature 1 and 2 Overview

APN 0605-051-01

Source:	Uinta Software
Acreage:	80.2-acres (Approximately)
Project #:	2026-77

RCA EST. 1990 ASSOCIATES, INC



Legend

- Approximate Top of Bank
- Diffuse Sheet Flow Area
- Braided Drainage Zone
- Centerline of Channel
- OHWM
- Project Boundary
- Secondary Distributary Flow Paths

Secondary distributary flow paths were mapped as associated centerline features; estimated area values are based on representative field widths and are included for reporting purposes only.

Figure 4: Feature 1 (Magnified)

APN 0605-051-01

Source:	Uinta Software
Acreage:	80.2-acres (Approximately)
Project #:	2026-77

RCA EST. 1990 ASSOCIATES, INC

Figure 5: Feature 2 (Magnified)

APN 0605-051-01

Source:	Uinta Software
Acreage:	80.2-acres (Approximately)
Project #:	2026-77

RCA EST. 1990 ASSOCIATES, INC

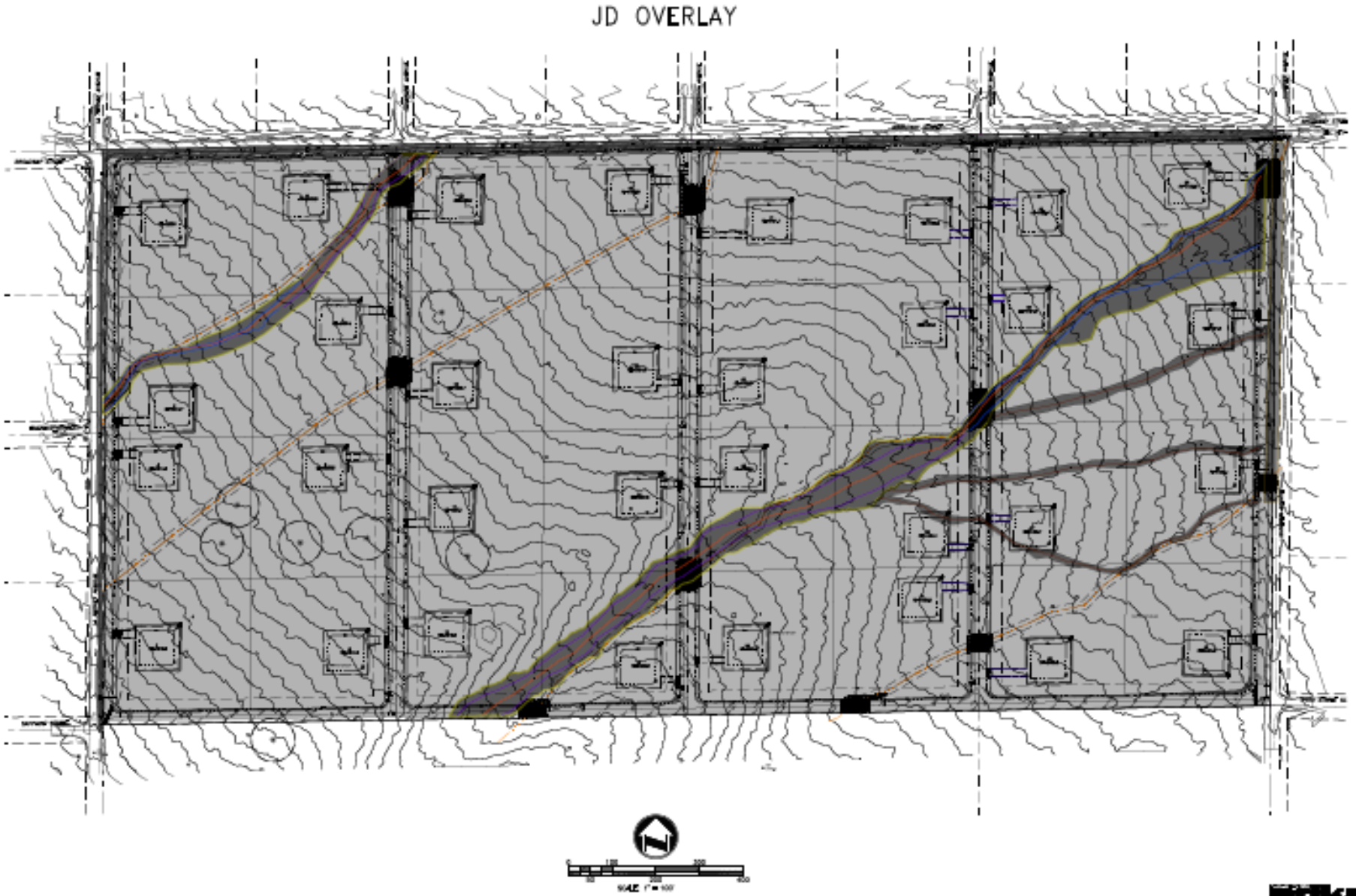
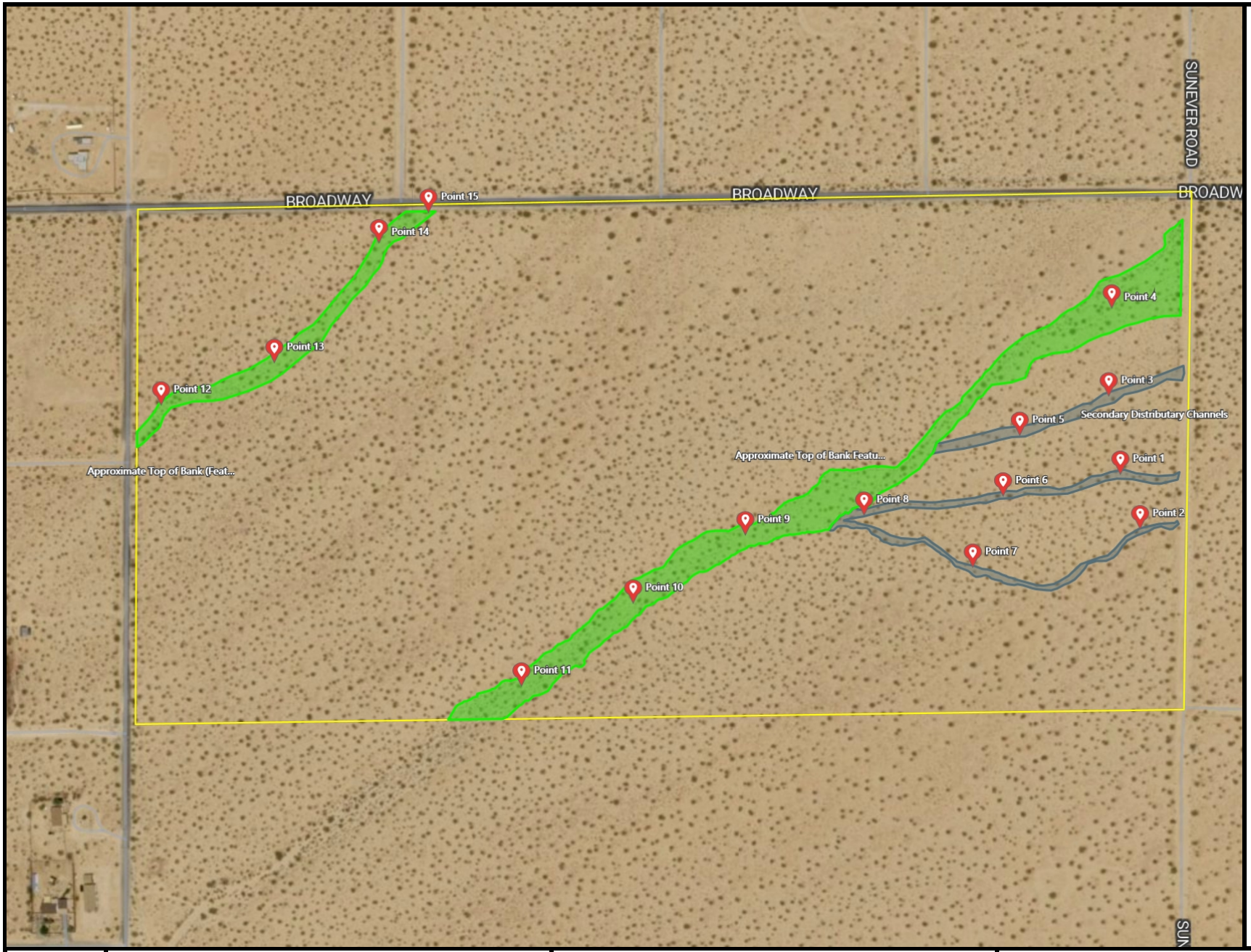


	Figure 6: Jurisdictional Delineation Overlay	**APN 0605-051-01**	Source:	Uinta Software	RCA EST. 1990 ASSOCIATES, INC
			Acreage:	81.2-acres (Approximately)	
			Project #:	2026-77	



Legend

- Approximate Top of Bank
- Photo Points
- Project Boundary
- Secondary Distributary Flow Paths

Figure 7: Photo Location Points Relative to Mapped Drainage Features

APN 0605-051-01

Source:	Uinta Software
Acreage:	80.2-acres (Approximately)
Project #:	2026-77

RCA EST. 1990 ASSOCIATES, INC

POINT 1 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 1 DOWNSTREAM VIEW (Secondary Distributary Flow Path)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 2 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 2 DOWNSTREAM VIEW (Secondary Distributary Flow)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 3 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 3 DOWNSTREAM VIEW (Secondary Distributary Flow Path)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 4 UPSTREAM VIEW (Feature 1)

POINT 4 DOWNSTREAM VIEW (Feature 1)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 5 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 5 DOWNSTREAM VIEW (Secondary Distributary Flow Path)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 6 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 6 DOWNSTREAM VIEW (Secondary Distributary Flow)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 7 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 7 DOWNSTREAM VIEW (Secondary Distributary Flow Path)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 8 UPSTREAM VIEW (Secondary Distributary Flow Path)

POINT 8 DOWNSTREAM VIEW (Secondary Distributary Flow)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 9 UPSTREAM VIEW (Feature 1)

POINT 9 DOWNSTREAM VIEW (Feature 1)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 10 UPSTREAM VIEW (Feature 1)

POINT 10 DOWNSTREAM VIEW (Feature 1)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 11 UPSTREAM VIEW (Feature 1)

POINT 11 DOWNSTREAM VIEW (Feature 1)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 12 UPSTREAM VIEW (Feature 2)

POINT 12 DOWNSTREAM VIEW (Feature 2)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 13 UPSTREAM VIEW (Feature 2)

POINT 13 DOWNSTREAM VIEW (Feature 2)

FIGURE 7: PHOTOGRAPHS OF SITE

POINT 14 UPSTREAM VIEW (Feature 2)

POINT 14 DOWNSTREAM VIEW (Feature 2)

FIGURE 7, cont: PHOTOGRAPHS OF SITE

POINT 15 UPSTREAM VIEW (Feature 2)

POINT 15 DOWNSTREAM VIEW (Feature 2)

FIGURE 7: PHOTOGRAPHS OF SITE

CULTURAL RESOURCES SURVEY UPDATE FOR THE JOSHUA TREE ESTATES PROJECT

COMMUNITY OF JOSHUA TREE, SAN BERNARDINO COUNTY, CALIFORNIA

APN 0605-051-01

Lead Agency:
County of San Bernardino
385 North Arrowhead Avenue
San Bernardino, California 92415

Preparer:
BFSA Environmental Services,
a Perennial Company
14010 Poway Road, Suite A
Poway, California 92064

Project Proponent:
Home Paradise Realty Group, Inc.
10392 Klingerman Street, Suite C
El Monte, California 91733

June 12, 2025

BFSA Environmental Services
A Perennial Company

Archaeological Database Information

Author:	Andrew J. Garrison, M.A., RPA
Consulting Firm:	BFSA Environmental Services, a Perennial Company 14010 Poway Road, Suite A Poway, California 92064 (858) 679-8218
Client/Project Proponent:	Home Paradise Realty Group, Inc. 10392 Klingerman Street, Suite C El Monte, California 91733
Report Date:	June 12, 2025
Report Title:	Cultural Resources Survey Update for the Joshua Tree Estates Project, Community of Joshua Tree, San Bernardino County, California
Type of Study:	Cultural Resources Survey
USGS Quadrangle:	Section 20, Township 1 North, Range 7 East of *Joshua Tree North*, *California* (7.5-minute) USGS Quadrangle
Acreage:	81.2 acres
Key Words:	Survey updated; historic cistern and refuse scatter (Site Temp-1); historic refuse scatter (Site Temp-2); no CRHR-eligible resources; monitoring of future grading recommended.

Table of Contents

Section	Description	Page
MANAGEMENT SUMMARY/ABSTRACT		*iv*
1.0	INTRODUCTION	1.0–1
	1.1 Project Description	1.0–1
	1.2 Environmental Setting	1.0–1
	1.3 Cultural Setting	1.0–5
	1.3.1 Prehistoric Period	1.0–5
	1.3.2 Historic Period	1.0–10
	1.4 Results of the Archaeological Records Search	1.0–14
	1.5 Applicable Regulations	1.0–16
	1.5.1 California Environmental Quality Act	1.0–16
2.0	RESEARCH DESIGN	2.0–1
3.0	ANALYSIS OF PROJECT EFFECTS	3.0–1
	3.1 Methods	3.0–1
	3.1.1 Field Methodology	3.0–1
	3.2 Results of the Field Survey	3.0–1
4.0	RECOMMENDATIONS	4.0–1
5.0	LIST OF PREPARERS AND ORGANIZATIONS CONTACTED	5.0–1
6.0	REFERENCES CITED	6.0–1

List of Appendices

Appendix A – Resumes of Key Personnel
Appendix B – Archaeological Records Search Results*
Appendix C – NAHC Sacred Lands File Search Results*
Appendix D – Confidential Maps*

**Deleted for public review and bound separately in the Confidential Appendix*

List of Figures

Figure	Description	Page
Figure 1.1–1	General Location Map	1.0–2
Figure 1.1–2	Project Location Map (USGS)	1.0–3
Figure 1.1–3	Project Development Map	1.0–4
Figure 3.2–1	Cultural Resource Location Map*	3.0–4
Figure 3.2–2	Cultural Resource Locations Shown on an Aerial Photograph*	3.0–5

**Deleted for public review and bound separately in the Confidential Appendix*

List of Plates

Plate	Description	Page
Plate 3.2–1	Overview of the project, facing southeast	3.0–2
Plate 3.2–2	Overview of the project, facing northwest	3.0–2
Plate 3.2–3	Overview of Site Temp-1, facing west	3.0–3
Plate 3.2–4	Overview of Site Temp-2, facing south	3.0–3

List of Tables

Table	Description	Page
Table 1.4–1	Cultural Resources Within One Mile of the Project	1.0–14

MANAGEMENT SUMMARY/ABSTRACT

In response to a request by the applicant, a cultural resources survey update was conducted by BFSA Environmental Services, a Perennial Company (BFSA), for the Joshua Tree Estates Project. The project consists of a proposed subdivision of an 81.2-acre parcel (Assessor's Parcel Number [APN] 0605-051-01), bounded by East Broadway, Laferney Avenue, and Sunever Road, in the Joshua Tree area of San Bernardino County, California. The project is situated within Section 20, Township 1 North, Range 7 East, as shown on the United States Geological Survey (USGS) (7.5-minute) *Joshua Tree North*, *California* topographic quadrangle. The property is currently vacant and was previously studied for cultural resources by BFSA in 2023 (see Garrison 2023).

The purpose of this investigation was to locate and record any cultural resources within the project and subsequently evaluate any resources as part of the County of San Bernardino environmental review process conducted in compliance with the California Environmental Quality Act (CEQA). The archaeological investigation of the project also includes the review of an archaeological records search performed at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton (CSU Fullerton) in order to assess previous archaeological studies and identify any previously recorded archaeological sites within the project or in the immediate vicinity. A Sacred Lands File (SLF) search was also requested from the Native American Heritage Commission (NAHC).

A review of an updated archaeological records search identified 10 cultural resources within one mile of the project, two of the resources, which consist of a historic trash scatter with a cistern (Site Temp-1) and a historic trash scatter (Site Temp-2), are located on the subject property. The remaining resources identified during the search include one prehistoric lithic scatter, three prehistoric isolates, one multicomponent site, one historic trash scatter, and two historic isolates. The records search results also identified seven cultural resources studies that have been conducted within one mile of the project. Of the previous studies, only the 2023 BFSA study, conducted in support of the current development, included the subject property. The 2023 BFSA study identified both sites Temp-1 and Temp-2 and conducted a Phase II testing and evaluation study. No significant intact cultural materials were recovered from the surface examinations or subsurface tests, and sites Temp-1 and Temp-2 were determined to be not CEQA-significant and not eligible for listing on the California Register of Historical Resources (CRHR) (Garrison 2023).

The updated cultural resources survey was conducted on June 4, 2025, under the direction of Principal Investigator Tracy A. Stropes, M.A., RPA. No previously unidentified resources were recorded during the survey. The two previously recorded historic trash scatters (Temp-1 and Temp-2) were located and found to be in the same condition as when previously evaluated by BFSA in 2023. As such, the updated survey has confirmed the 2023 results for the Joshua Tree Estates Project that no CRHR-eligible resources are located on the subject property.

The results of the cultural resources survey update for the Joshua Tree Estates Project are

consistent with the 2023 BFSA findings (Garrison 2023). Sites Temp-1 and Temp-2 within the subject property are not significant and ineligible for listing on the CRHR. Therefore, site-specific mitigation measures will not be required. However, the development of the subject property may impact cultural resources that have not been previously identified. Therefore, consistent with the 2023 BFSA recommendations, it is recommended that the project be conditioned with archaeological monitoring during ground-disturbing activities tied to the future residential development of the property. A copy of this report will be permanently filed with the SCCIC at CSU Fullerton. All notes, photographs, and other materials related to this project will be curated at the BFSA archaeological laboratory in Poway, California.

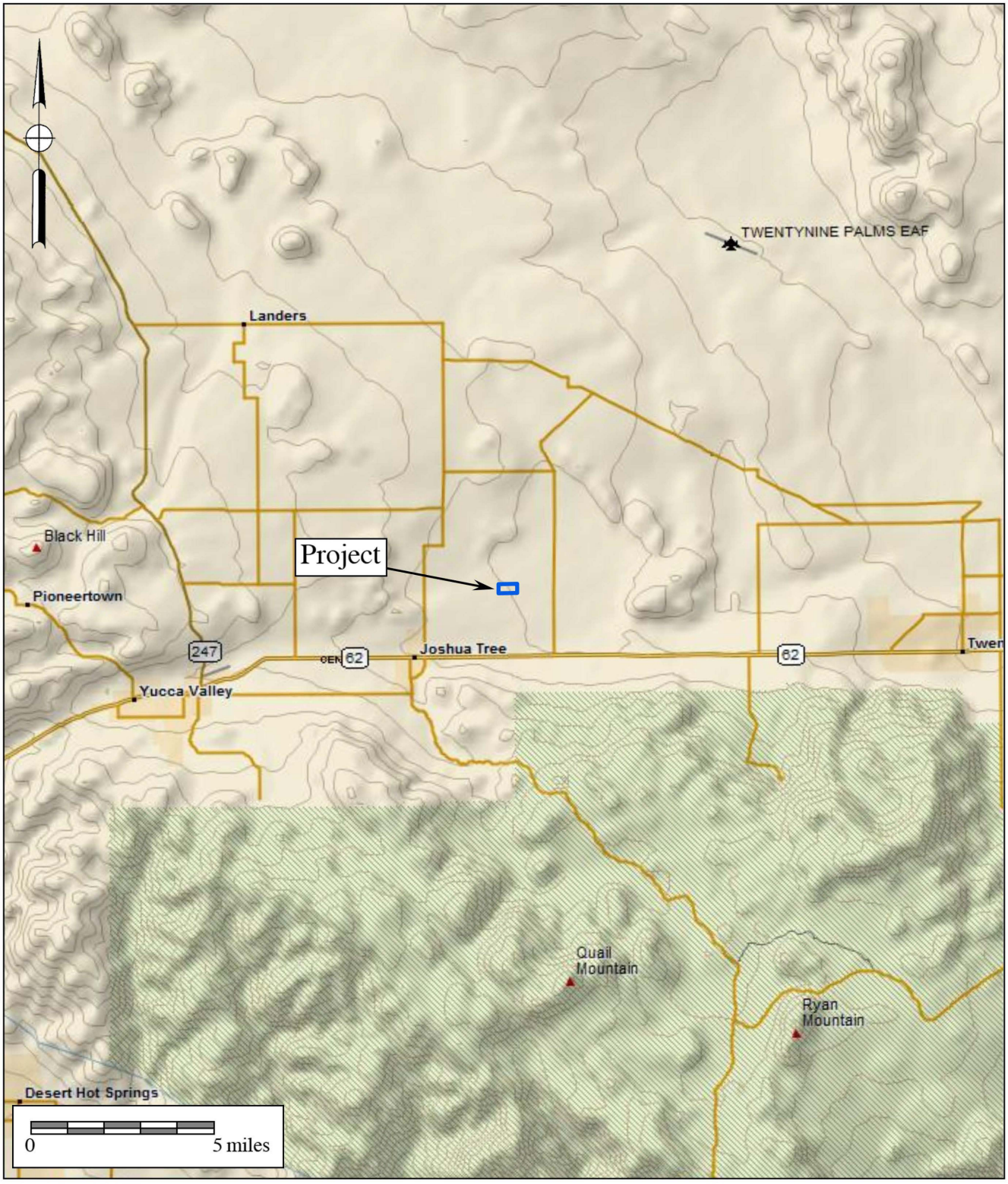
1.0 INTRODUCTION

1.1 Project Description

The archaeological survey update for the Joshua Tree Estates Project was conducted to comply with CEQA and the County of San Bernardino environmental requirements. The 81.2-acre project is bounded by East Broadway, Laferney Avenue, and Sunever Road in the Joshua Tree area of San Bernardino County, California (APN 0605-051-01) (Figure 1.1–1). The project is situated within Section 20, Township 1 North, Range 7 East, as shown on the USGS *Joshua Tree North, California* topographic quadrangle (Figure 1.1–2). The project proposes the subdivision of the property into 29 residential lots, which range in size between 2.01 and 2.36 acres, along with 11.00 acres dedicated for road development and improvements (Figure 1.1–3). The decision to request this investigation was based upon the cultural resource sensitivity of the locality as suggested by known site density and predictive modeling. Sensitivity for cultural resources in a given area is usually indicated by known settlement patterns, which, in southwestern San Bernardino County, were focused around freshwater resources and a food supply. The project was previously studied by BFSA in 2023 (see Garrison 2023). In response to comments for an updated review of the project, BFSA conducted this archaeological survey update.

1.2 Environmental Setting

The Joshua Tree Estates Project is located in the Mojave Desert Geomorphic Province of southern California. This area contains isolated mountain ranges separated by expanses of desert plains. The project is located within the Coyote Valley, south of the Bunker Mountains, east of the Bartlett Mountains, west of Coyote Lake, and north of Joshua Tree National Monument. A northeast-to-southwest trending ephemeral wash traverses the property. As shown on the geologic map by Thomas Dibblee (2008), most of the project is composed of Holocene-aged alluvium. The Holocene alluvium is comprised of gravel, sand, silt, and clay deposited within the valley in the last 11,700 years. The southwestern corner of the project is mapped as Pleistocene-aged older alluvium, consisting of gravels and sand. The older alluvial deposits underlie the younger Holocene deposits at the project at unknown but likely variable depths. The age of the older alluvial deposits is estimated anywhere between 11,700 years to perhaps as much as two million years old. Soils within the project have not been mapped by the National Resources Conservation Service Web Soil Survey (NRCS 2019). Elevations within the project range from approximately 2,475 to 2,519 feet above mean sea level.

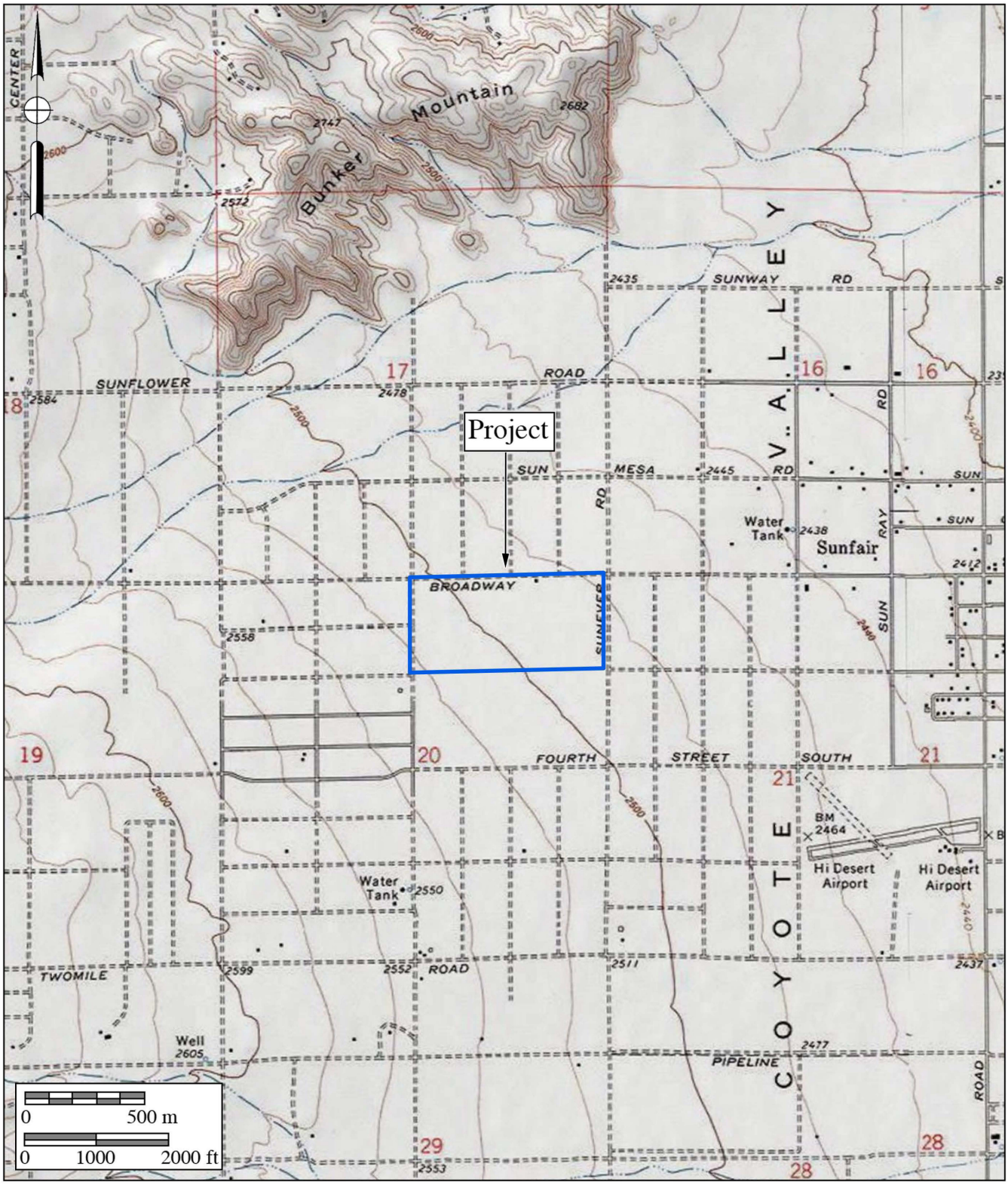


BFSA Environmental Services
A Perennial Company

Figure 1.1–1
General Location Map

The Joshua Tree Estates Project

DeLorme (1:250,000 series)

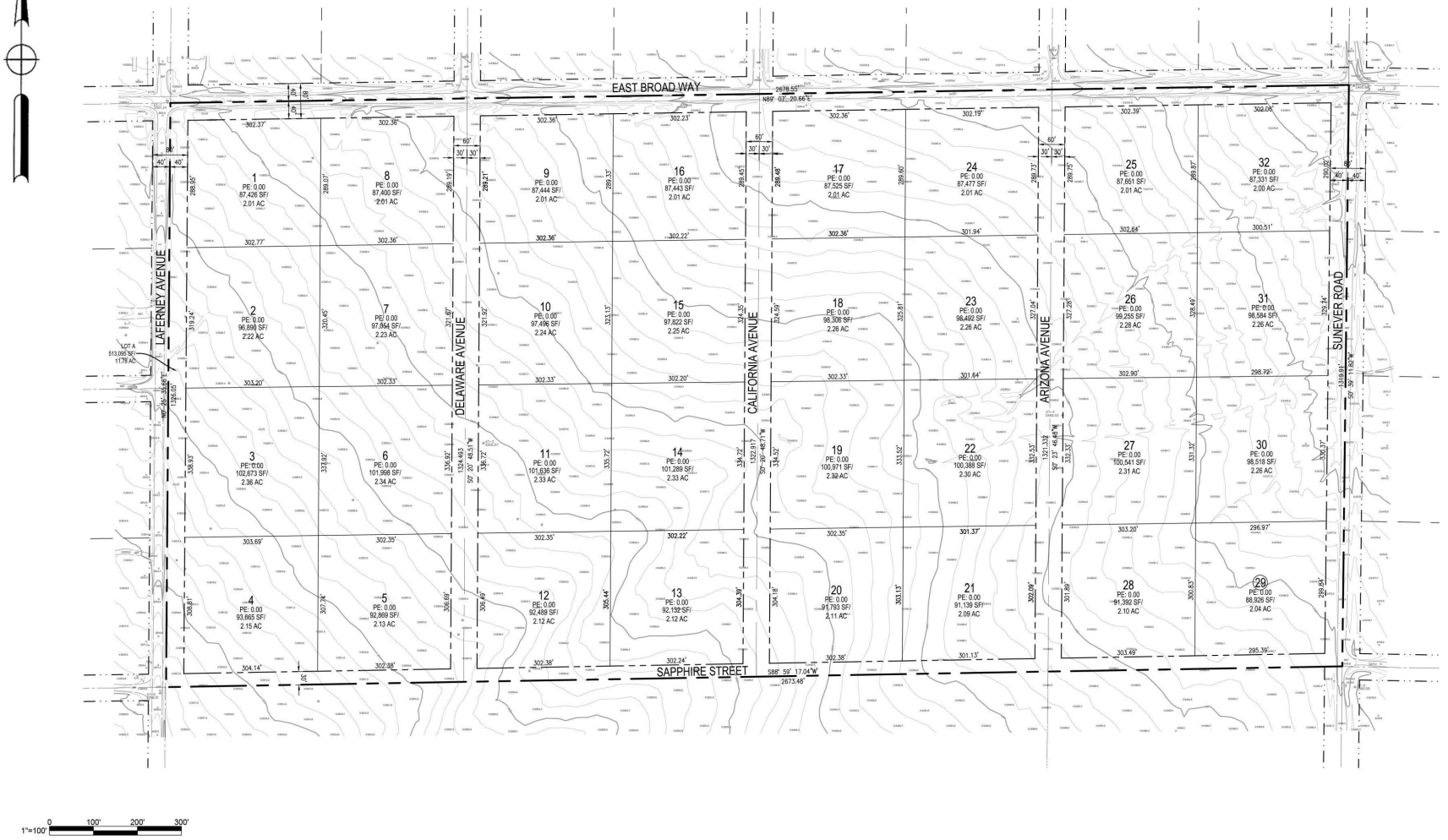


BFSA Environmental Services
A Perennial Company

Figure 1.1–2
Project Location Map

The Joshua Tree Estates Project

USGS *Joshua Tree North* Quadrangle (7.5-minute series)



BFSA Environmental Services
A Perennial Company

Figure 1.1–3
Project Development Map
The Joshua Tree Estates Project

1.3 Cultural Setting

The subject property is located in the traditional territory primarily associated with the Serrano. Although the Mojave Desert is an area believed to have had limited prehistoric subsistence resources, it has historically supported a long and occasionally dense population. Evidence of villages and camps, burials, quarries, rock features, and bedrock mortars has been documented at archaeological sites across the desert, some of which contain evidence of a lengthy prehistoric time span. Although early archaeological remains are not found frequently, when they are, they are generally located along the margins of former pluvial lakes or in areas of dune deflation. In contrast, artifacts on the desert floor may be sparse, widely scattered, and mixed with the desert pavements. For the region, archaeologists have reached a broad consensus regarding the general cultural chronology. The identified sequence includes the Paleo Indian Period, the Lake Mojave Period, the Pinto Period, the Gypsum Period, the Saratoga Springs Period, and the Ethnohistoric Period.

1.3.1 Prehistoric Period

Paleo Indian Period (12,000 to circa 10,000 YBP)

Archaeologically, the Paleo Indian Period is associated with the terminus of the late Pleistocene (12,000 to 10,000 YBP). The environment during the late Pleistocene was cool and moist, which allowed for glaciation in the mountains and the formation of deep, pluvial lakes in the deserts and basin lands (Moratto 1984). However, by the terminus of the late Pleistocene, the climate became warmer, which caused the glaciers to melt, sea levels to rise, greater coastal erosion, large lakes to recede and evaporate, extinction of Pleistocene megafauna, and major vegetation changes (Moratto 1984; Martin 1967, 1973; Fagan 1991). The coastal shoreline at 10,000 YBP, depending upon the particular area of the coast, was near the 30-meter isobath, or two to six kilometers further west than its present location (Masters 1983).

Paleo Indians were likely attracted to multiple habitat types, including mountains, marshlands, estuaries, and lakeshores. These people likely subsisted using a more generalized hunting, gathering, and collecting adaptation utilizing a variety of resources including birds, mollusks, and both large and small mammals (Erlandson and Colten 1991; Moratto 1984; Moss and Erlandson 1995).

Lake Mojave Period (Late Pleistocene: 10,000 to 7,000 YBP)

The earliest documented evidence of human occupation in the Mojave Desert and surrounding areas comes from the Paleo Indian Period, a cultural expression referred to as the Western Pluvial Lakes Tradition (WPLT). The WPLT occurred in the western Great Basin and covered an area that stretched from the now arid lands of southern California to Oregon. A cultural adaptation to pluvial conditions (e.g., lakes, marshes, and grasslands) flourished for thousands of years after approximately 9000 B.C., but disappeared in response to the warming and drying trends of the Altithermal climatic period (Moratto 1984). One of the most well known expressions of the

WPLT is the Lake Mojave Complex, which is thought to have covered a vast area including parts of the southwestern Great Basin and the Mojave Desert, and may have reached as far south as the San Diego area. Artifacts indicative of the Lake Mojave Complex include foliated points and knives, Lake Mojave points, Silver Lake points, and flaked-stone crescents. Similar artifacts have been subsequently recorded along the shoreline of many other pluvial lakes in the Mojave Desert. Archaeological studies by Mark Sutton (1988) suggested that, at the time of the Lake Mojave Complex, much of Antelope and Fremont valleys may have been covered by Pleistocene Lake Thompson. In her 1978 work, Davis (1978) argues that the wetlands generated as a result of such Pliestocene lakes would have been a great attraction to the region's early occupants. This would result in an adaptive strategy that was more generalized, focusing on hunting and the overall exploitation of wetland resources. In general, it is clear that cultures across California adapted to wetland environments generated by pluvial lake ecological systems (Moratto 1984).

Pinto Period (7,000 to 4,000 YBP)

The Pinto Period dates to the end of the Pleistocene, when the severe and dramatic environmental change from pluvial to arid conditions began (Moratto 1984). Pinto Period sites are found mostly near ephemeral lakes and now dry streams and springs, suggesting that as the region began to dry, new subsistence adaptations were necessary. Projectile points associated with the Pinto Period are characterized as larger atlatl dart points, as opposed to arrowhead points, which were introduced later. This period has been described as a highly mobile desert economy, with an emphasis on hunting, supplemented by the use of processed seeds (Moratto 1984). However, the collections believed to represent the Pinto Period are largely lacking in well-developed milling technologies according to Moratto (1984). Pinto Period artifacts have been interpreted as indications of temporary or seasonal occupations by small groups of people. Sites of this period are generally small in scale and are typically absent of a developed midden. More recent studies (Sutton et al. 2007) suggest that the Pinto Period may have actually started in the early Holocene, overlapping the Lake Mojave Period. A series of radiocarbon dates from Little Lake, Pinto Basin, Twentynine Palms and Fort Irwin suggest Pinto sites with antiquity of upwards of 9,000 years (Sutton et al. 2007), indicating these sites may be of greater antiquity than previously suggested.

Gypsum Period (4,000 to 1,500 YBP)

The presence of Humboldt Concave Base, Gypsum Cave, Elko Eared, or Elko corner-notched points are believed to be indicative of the Gypsum Period (radiocarbon dated from 4,000 to 1,500 YBP). The Gypsum Period reflects a more intensive desert occupation as temperatures began to regulate during the First Neoglacial episode at the beginning of the late Holocene (Warren 1984; Sutton et al. 2007). During this time, indications of trade with coastal populations are evidenced by the presence of shell beads in the archaeological record. An increase in milling stones and manos has been found in association with this period, which indicates an increased use

of hard seeds (Moratto 1984; Warren 1984; Sutton et al. 2007). In comparison to sites from the preceding periods, Gypsum Period sites are generally smaller, higher in frequency, and distributed across a range of environments. Further, Gypsum Period sites also display evidence of exploitation of *artiodactyls*, rabbits, and rodents, as well as a wide range of seeds. Adaptations resulting from better adapted technologies combined with what was likely more complex social organization likely facilitated the ease of adaptation to the warming and drying conditions that initiated circa 2,000 years ago. The continued use of the region during the Gypsum Period indicates an overall more successful adaptation to the warm and dry conditions during this period (Warren 1984; Sutton et al. 2007).

Several scholars associate this period with the division of the Uto-Aztecan language, approximately 3,000 to 2,500 years ago (Moratto 1984; Warren 1984; Sutton et al. 2007). The major language groups that emerged from this division are Numic, spoken by the Kawaiisu and Piute; Takic, spoken by the Kitanemuk, Serrano, Gabrielino, and other southern California Shoshonean speakers; Hopic, spoken in the southwest; and Tubatulabalic, spoken by the Tubatulabal in the southern Sierra Nevada Mountains. A shift in settlement patterns toward a more sedentary lifestyle occurred during this period, characterized by the emergence of large permanent or semi-permanent village sites and associated cemeteries.

Saratoga Springs Period (1,500 to 800 YBP)

The Saratoga Springs Period is characterized by a transition from larger dart points to smaller arrow points. The presence of arrow points suggest that the bow and arrow were introduced to the Mojave Desert during the Saratoga Springs Period. This, combined with evidence from rock art motifs, leads scholars to argue for a shift from atlatls to use of the bow and arrow either during the end of the Gypsum Period or the beginning of the Saratoga Springs Period. This technological advancement likely improved overall hunting efficiency and possibly the carrying capacity for local population (Warren 1984). This in turn may have resulted in a significant increase in population as suggested by archaeological data. During this period, the development of large village sites with cemeteries and well-developed middens indicate long-term occupations in comparison to previous periods. This period saw an increase in trade with Arizona and other areas of the southwest. Evidence in the archaeological record shows that Brown and Buff wares (pottery styles), characteristic of Arizona, made their way to the California desert by 900 A.D. It is also believed that the Anasazi mined turquoise in the eastern California desert about this time. While the presence of Hakataya influence may have extended as far north and west as the eastern Antelope Valley (Warren 1984), influence in the western Mojave appear to have been minimal. During the second half of the Saratoga Springs Period, the rise in temperatures and return to xeric conditions around A.D. 700 likely led to population decline, and eventually the terminus of the Saratoga Springs complex circa A.D. 1100 (Sutton et al. 2007).

Ethnohistoric Period (800 YPB to the Time of European Contact)

Prior to European presence in North America, Native American groups subsisted along the shores of the no longer extant lakes of the Great Basin region that covered the major portion of the present-day Mojave Desert. It was along these shores that Native Americans made their homes, produced their tools, and left an indelible mark upon the landscape. However, by the time the first Spanish explorers ventured into what is now southern California in 1769, the pluvial lakes had long since vanished, leaving the Mojave River to support primarily the Paiute and the Mohave tribes. Ethnohistoric and ethnographic evidence indicates that prior to the arrival of the Spanish missionaries, the area around the project was inhabited by the Serrano (Moratto 1984; Sutton et al. 2007). Ethnographic data for the Serrano is presented below.

Serrano: An Archaeological and Ethnographic Perspective

Aboriginally, the Serrano occupied an area east of present-day Los Angeles. According to Bean and Smith (1978b), definitive boundaries are difficult to place for the Serrano due to their sociopolitical organization and a lack of reliable data:

> The Serrano were organized into autonomous localized lineages occupying definite, favored territories, but rarely claiming any territory far removed from the lineage's home base. Since the entire dialectical group was neither politically united nor amalgamated into supralineage groups, as many of their neighbors were, one must speak in terms of generalized areas of usage rather than pan-tribal holdings. (Strong [1971] in Bean and Smith 1978b)

However, researchers place the Serrano in the San Bernardino Mountains, east of Cajon Pass, and at the base of and north of the mountains near Victorville, east to Twentynine Palms, and south to the Yucaipa Valley (Bean and Smith 1978b). Serrano has been used broadly for languages in the Takic family including Serrano, Kitanemuk, Vanyume, and Tataviam.

Subsistence and Settlement

Serrano village locations were typically located near water sources. Individual family dwellings were likely circular, domed structures. Daily household activities would either take place outside of the house out in the open, or under a ramada constructed of a thatched willow pole roof held up by four or more poles inserted into the ground. Families could consist of a husband, wife/wives, unmarried female children, married male children, the husband's parents, and/or widowed aunts and uncles. Rarely, an individual would occupy his own house, typically in the mountains. Serrano villages also included a large ceremonial house where the lineage leader would live, which served as the religious center for lineages or lineage-sets, granaries, and sweathouses (Bean and Smith 1978b).

The Serrano were primarily hunters and gatherers. Vegetal staples varied with locality. Acorns and piñon nuts were found in the foothills, and mesquite, yucca roots, cacti fruits, and piñon nuts were found in or near the desert regions. Diets were supplemented with other roots, bulbs, shoots, and seeds (Heizer 1978). Deer, mountain sheep, antelopes, rabbits, and other small rodents were among the principal food packages. Various game birds, especially quail, were also hunted. The bow and arrow were used for large game, while smaller game and birds were killed with curved throwing sticks, traps, and snares. Occasionally, game was hunted communally, often during mourning ceremonies (Benedict 1924; Drucker 1937; Heizer 1978). Earth ovens were used to cook meat, bones were boiled to extract marrow, and blood was either drunk cold or cooked to a thicker consistency and then eaten. Some meat and vegetables were sun-dried and stored. Food acquisition and processing required the manufacture of additional items such as knives, stone, or bone scrapers, pottery trays and bowls, bone or horn spoons, and stirrers. Mortars, made of either stone or wood, and metates were also manufactured (Strong 1971; Drucker 1937; Benedict 1924).

Social Organization

The Serrano were part of "exogamous clans, which in turn were affiliated with one of two exogamous moieties, *tuk^{w}utam* (Wildcat) and *wahiʔiam* (Coyote)" (Bean and Smith 1978b). According to Strong (1971), details such as number, structure, and function of the clans are unknown. Instead, he states that clans were not political, but were rather structured based upon "economic, marital, or ceremonial reciprocity, a pattern common throughout Southern California" (Bean and Smith 1978b). The Serrano formed alliances amongst their own clans and with Cahuilla, Chemehuevi, Gabrielino, and Cupeño clans (Bean and Smith 1978b). Clans were large, autonomous, political, and landholding units formed patrilineally, with all males descending from a common male ancestor, including all wives and descendants of the males. However, even after marriage, women would still keep their original lineage, and would still participate in those ceremonies (Bean and Smith 1978b).

According to Bean and Smith (1978b), the cosmogony and cosmography of the Serrano are very similar to those of the Cahuilla:

> There are twin creator gods, a creation myth told in "epic poem" style, each local group having its own origin story, water babies whose crying foretells death, supernatural beings of various kinds and on various hierarchically arranged power-access levels, an Orpheus-like myth, mythical deer that no one can kill, and tales relating the adventures (and misadventures) of Coyote, a tragicomic trickster-transformer culture hero. (Bean [1962-1972] and Benedict [1924] in Bean and Smith 1978b)

The Serrano had a shaman, a person who acquired their powers through dreams, which were induced through ingestion of the hallucinogen datura. The shaman was mostly a curer/healer, using herbal remedies and "sucking out the disease-causing agents" (Bean and Smith 1978b).

Material Culture

The Serrano were very similar technologically to the Cahuilla. In general, manufactured goods included baskets, some pottery, rabbit-skin blankets, awls, arrow straighteners, sinew-backed bows, arrows, fire drills, stone pipes, musical instruments (rattles, rasps, whistles, bull-roarers, and flutes), feathered costumes, mats for floor and wall coverings, bags, storage pouches, cordage (usually comprised of yucca fiber), and nets (Heizer 1978).

1.3.2 Historic Period

Traditionally, the history of the state of California has been divided into three general periods: the Spanish Period (1769 to 1821), the Mexican Period (1822 to 1846), and the American Period (1848 to present) (Caughey 1970). The American Period is often further subdivided into additional phases: the nineteenth century (1848 to 1900), the early twentieth century (1900 to 1950), and the Modern Period (1950 to present). From an archaeological standpoint, all of these phases can be referred to together as the Ethnohistoric Period. This provides a valuable tool for archaeologists, as ethnohistory is directly concerned with the study of indigenous or non-Western peoples from a combined historical/anthropological viewpoint, which employs written documents, oral narrative, material culture, and ethnographic data for analysis.

European exploration along the California coast began in 1542 with the landing of Juan Rodriguez Cabrillo and his men at San Diego Bay. Sixty years after the Cabrillo expeditions, an expedition under Sebastian Viscaíno made an extensive and thorough exploration of the Pacific coast. Although the voyage did not extend beyond the northern limits of the Cabrillo track, Viscaíno had the most lasting effect upon the nomenclature of the coast. Many of his place names have survived, whereas practically every one of the names created by Cabrillo have faded from use. For instance, Cabrillo named the first (now) United States port he stopped at “San Miguel”; 60 years later, Viscaíno changed it to “San Diego” (Rolle 1969). The early European voyages observed Native Americans living in villages along the coast but did not make any substantial, long-lasting impact. At the time of contact, the Luiseño population was estimated to have ranged from 4,000 to as many as 10,000 individuals (Bean and Shipek 1978; Kroeber 1976).

The historic background of the project area began with the Spanish colonization of Alta California. The first Spanish colonizing expedition reached southern California in 1769 with the intention of converting and civilizing the indigenous populations, as well as expanding the knowledge of and access to new resources in the region (Brigandi 1998). As a result, by the late eighteenth century, a large portion of southern California was overseen by Mission San Luis Rey (San Diego County), Mission San Juan Capistrano (Orange County), and Mission San Gabriel (Los Angeles County), who began colonizing the region and surrounding areas (Chapman 1921).

Native Californians may have first coalesced with Europeans around 1769 when the first Spanish mission was established in San Diego. In 1771, Friar Francisco Graces first searched the Californian desert for potential mission sites. Interactions between local tribes and Franciscan priests occurred by 1774 when Juan Bautista De Anza made an exploration of Alta California.

Serrano contact with the Europeans may have occurred as early as 1771 or 1772, but it was not until approximately 1819 that the Spanish directly influenced the culture. The Spanish established asistencias in San Bernardino, Pala, and Santa Ysabel. Between the founding of the asistencia and secularization in 1834, most of the Serranos in the San Bernardino Mountains were removed to the nearby missions (Beattie and Beattie 1951:366) while the Cahuilla maintained a high level of autonomy from Spain (Bean 1978).

Each mission gained power through the support of a large, subjugated Native American workforce. As the missions grew, livestock holdings increased and became increasingly vulnerable to theft. To protect their interests, the southern California missions began to expand inland to try and provide additional security (Beattie and Beattie 1939; Caughey 1970). In order to meet their needs, the Spaniards embarked upon a formal expedition in 1806 to find potential locations within what is now the San Bernardino Valley. As a result, by 1810, Father Francisco Dumetz of Mission San Gabriel had succeeded in establishing a religious site, or capilla, at a Cahuilla rancheria called Guachama (Beattie and Beattie 1939). San Bernardino Valley received its name from this site, which was dedicated to San Bernardino de Siena by Father Dumetz. The Guachama rancheria was located in present-day Bryn Mawr in San Bernardino County.

These early colonization efforts were followed by the establishment of estancias at Puente (circa 1816) and San Bernardino (circa 1819) near Guachama (Beattie and Beattie 1939). These efforts were soon mirrored by the Spaniards from Mission San Luis Rey, who in turn established a presence in what is now Lake Elsinore, Temecula, and Murrieta (Chapman 1921). The indigenous groups who occupied these lands were recruited by missionaries, converted, and put to work in the missions (Pourade 1961). Throughout this period, the Native American populations were decimated by introduced diseases, a drastic shift in diet resulting in poor nutrition, and social conflicts due to the introduction of an entirely new social order (Cook 1976).

Mexico achieved independence from Spain in 1822 and became a federal republic in 1824. As a result, both Baja and Alta California became classified as territories (Rolle 1969). Shortly thereafter, the Mexican Republic sought to grant large tracts of private land to its citizens to begin to encourage immigration to California and to establish its presence in the region. Part of the establishment of power and control included the desecularization of the missions circa 1832. These same missions were also located on some of the most fertile land in California and, as a result, were considered highly valuable. The resulting land grants, known as "ranchos," covered expansive portions of California and by 1846, more than 600 land grants had been issued by the Mexican government. Rancho Jurupa was the first rancho to be established and was issued to Juan Bandini in 1838. Although Bandini primarily resided in San Diego, Rancho Jurupa was located in what is now Riverside County (Pourade 1963). A review of Riverside County place names quickly illustrates that many of the ranchos in Riverside County lent their names to present-day locations, including Jurupa, El Rincon, La Sierra, El Sobrante de San Jacinto, La Laguna (Lake Elsinore), Santa Rosa, Temecula, Pauba, San Jacinto Nuevo y Potrero, and San Jacinto Viejo (Gunther 1984). As was typical of many ranchos, these were all located in the valley environments within western Riverside County.

The treatment of Native Americans grew worse during the Rancho Period. Most of the Native Americans were forced off their land or put to work on the now privately-owned ranchos, most often as slave labor. Considering the brutality of the ranchos, the degree to which Native Americans had become dependent upon the mission system is evident when, in 1838, a group of Native Americans from Mission San Luis Rey petitioned government officials in San Diego to relieve suffering at the hands of the rancheros:

> We have suffered incalculable losses, for some of which we are in part to be blamed for because many of us have abandoned the Mission … We plead and beseech you … to grant us a Rev. Father for this place. We have been accustomed to the Rev. Fathers and to their manner of managing the duties. We labored under their intelligent directions, and we were obedient to the Fathers according to the regulations, because we considered it as good for us. (Brigandi 1998:21)

Native American culture had been disrupted to the point where they could no longer rely upon prehistoric subsistence and social patterns. Not only does this illustrate how dependent the Native Americans had become upon the missionaries, but it also indicates a marked contrast in the way the Spanish treated the Native Americans as compared to the Mexican and United States ranchers. Spanish colonialism (missions) is based upon utilizing human resources while integrating them into their society. The ranchers, both Mexican and American, did not accept Native Americans into their social order and used them specifically for the extraction of labor, resources, and profit. Rather than being incorporated, they were either subjugated or exterminated (Cook 1976).

In 1846, war erupted between Mexico and the United States. In 1848, with the signing of the Treaty of Guadalupe Hidalgo, the region was annexed as a territory of the United States, and in 1850, California became a state. These events generated a steady flow of settlers into the area, including gold miners, entrepreneurs, health-seekers, speculators, politicians, adventurers, seekers of religious freedom, and individuals desiring to create utopian colonies. As the non-native population increased through immigration, the indigenous population rapidly declined from the high morbidity of European diseases, low birth rates, and conflict and violence. California became a state in 1850 and was divided into 21 counties. The dwindling native populations were eventually displaced into reservations after California became a stat

By 1846, tensions between the United States and Mexico had escalated to the point of war (Rolle 1969). In order to reach a peaceful agreement, the Treaty of Guadalupe Hidalgo was put into effect in 1848, which resulted in the annexation of California to the United States. Once California opened to the United States, waves of settlers moved in searching for gold mines, business opportunities, political opportunities, religious freedom, and adventure (Rolle 1969; Caughey 1970). By 1850, California had become a state and was eventually divided into 27 separate counties. A much larger population was now settling in California, primarily in the central

valley, San Francisco, and the Gold Rush region of the Sierra Nevada mountain range (Rolle 1969; Caughey 1970). During this time, southern California grew at a much slower pace than northern California and was still dominated by the cattle industry that was established during the earlier rancho period.

By the late 1880s and early 1890s, there was growing discontent between San Bernardino and Riverside, its neighbor 10 miles to the south, due to differences in opinion concerning religion, morality, the Civil War, politics, and fierce competition to attract settlers. After a series of instances in which charges were claimed about unfair use of tax monies to the benefit of only the city of San Bernardino, several people from Riverside decided to investigate the possibility of a new county. In May 1893, voters living within portions of San Bernardino County (to the north) and San Diego County (to the south) approved the formation of Riverside County. Early business opportunities were linked to the agriculture industry, but commerce, construction, manufacturing, transportation, and tourism also provided a healthy local economy.

A Brief History of the Project Vicinity

In the early 1860s, as gold mining in the Sierra Nevada mountains began to decline, many miners looked to the Mojave Desert. However, it was not until the discovery of silver in Calico and the construction of the Southern Pacific Railroad from Mojave to Daggett in 1882 that the region became a mining center. This gave rise to the now famous 20-mule teams. Ten teams were hitched together with two wagons and a water wagon to haul ore from Daggett to the town of Calico. The rich silver deposits gave birth to Calico Mines, Waterman Mines, and Daggett Mills (Kyle 1990). One of the most prevalent mines in the Morongo Basin region was the Desert Queen Mine, where gold was discovered in the 1890s. The mine remained in operation until 1961 (Chappell 1971). Although many miners hoped to find gold or silver, these ventures also bolstered the non-metallic mining industry, which remains a significant portion of the Morongo Basin and greater Mojave Desert commercial industry (Fife 1988).

Transportation has also been instrumental in the development of the Morongo Basin. In the 1930s, State Route (SR) 62, also known as the Twentynine Palms Highway) replaced the Banning-Dale Road as the preferred route through the Morongo Basin. The Banning-Dale Road had emerged in the 1910s, but the general alignment had been utilized since the 1840s or 1850s as a wagon trail reportedly established by Powell "Paulino" Weaver (Grubbs 2007).

In 1936 Joshua Tree National Monument was established, which also increased travel and the popularity of the Morongo Basin region (NPS 2019). Not long after, in 1937, the Joshua Tree Townsite Company built offices along Twentynine Palms Road (Smith 1996). An article published on the z107.7fm radio station website states that:

> From 1941-1944, the population grew from 49 to 227 people. The first business block of 5 stores was built in 1945 and the first Post Office was built in 1946. In 1949, the area shared filming sites with nearby Pioneer Town and boasted a thriving

> turkey industry; and in 1950, villagers celebrated the completion of their self-built fire station. In 1963, the Hi-Desert Memorial Hospital District was established, and the then Joshua Tree Fire Protection District expanded. The population climbed to 3,800 people by 1967 and up to 4,500 people by 1969. By the 1970s, the area began to see more extensive development, including a Modern hospital on White Feather Road and the completion of the Joshua Tree Community Center in 1979. (Smith 1996)

As part of the Desert Protection Bill, Joshua Tree National Monument was elevated to park status on October 31, 1994, and 234,000 acres were added to the new park's boundaries (NPS 2019).

1.4 Results of the Archaeological Records Search

BFSA conducted an updated archaeological records search for a one-mile radius around the project from the SCCIC at CSU Fullerton. The updated SCCIC records search identified 10 cultural resources within one mile of the project, two of the resources consisting of a historic trash scatter with cistern (Site Temp-1) and a historic trash scatter (Temp-2) are located within the subject property. The remaining resources identified during the search include one prehistoric lithic scatter, three prehistoric isolates, one multicomponent site, one historic trash scatter, and two historic isolates (Table 1.4–1).

Table 1.4–1
Cultural Resources Within One Mile of the Project

Site Number	Resource Type
P-36-009595	Prehistoric lithic scatter
P-36-025046, P-36-025048, and P-36-026907	Prehistoric isolate
P-36-028351	Multicomponent site containing two prehistoric lithic scatters, a prehistoric isolate, the historic Roy Williams Airport/Hi-Desert Airport, two historic trash scatters, and one historic isolate
Temp-1*	Historic trash scatter with cistern
P-36-025036; and Temp-2*	Historic trash scatter
P-36-025047 and P-36-025049	Historic isolate

* Located on the subject property

The records search results also identified seven cultural resources studies that have been conducted within one mile of the project. Of the previous studies, only the 2023 BFSA study, conducted in support of the current development, included the subject property, the results of which are presented below (Garrison 2023).

The 2023 BFSA survey of the property resulted in the identification of the two historic

archaeological sites (Temp-1 and Temp-2). Site Temp-1 consists of a cistern and a historic artifact scatter at the location where structures are visible on aerial photographs between 1953 and 1989. Site Temp-2 is a historic artifact scatter just northwest of the intersection of 3rd Street and Sunever Road. The site assemblage primarily consists of cans, metal, and glass fragments. Following identification of sites Temp-1 and Temp-2, BFSA conducted a Phase II testing and evaluation study of the resources (Garrison 2023). This included the detailed recordation of each site on Department of Parks and Recreation (DPR) site record forms, the collection of a representative sample of surface artifacts, and shovel test pit (STP) excavations at each of the sites. The artifact assemblage for Site Temp-1 was found to date between the late 1960s and 1970s. The assemblage for Site Temp-2 was found to date between the late 1950s and 1960s. No significant intact cultural materials were recovered from the 2023 surface examinations or subsurface tests, and sites Temp-1 and Temp-2 were determined to be not CEQA-significant and not eligible for listing on the CRHR (Garrison 2023). The complete records search results can be found in Appendix B.

In addition, BFSA reviewed the following historic sources:

- The National Register of Historic Places Index
- The Office of Historic Preservation (OHP), Archaeological Determinations of Eligibility
- The OHP, Built Environment Resource Directory
- Bureau of Land Management (BLM) General Land Office (GLO) records
- Historic USGS maps
- Historic aerial photographs (1953, 1970, 1983, 1989, 1995, 2005, 2009, 2010, 2012, 2014, 2016, 2018, 2021)

The BLM GLO records show a 1930 patent was issued to Laura Burns for the property and surrounding area, which comprised the entirety of the northeast quarter of Section 20, Township 1 North, Range 7 East. San Bernardino County Assessor's data on file with the Property Information Management System show the project parcel was acquired by Kenneth and Neva Claypool in 1965. According to the aerial photographs, one structure is visible in the northeast quarter of the property by 1953, approximately 50 feet south of East Broadway. This structure is also visible on the 1955 USGS 15' *Joshua Tree* quadrangle map. By 1970, an additional structure, possibly a shed, is also visible at this location. Although the images are blurry, it does appear that the structures are still present in the 1983 and 1989 photographs. By 1995, the structures are no longer visible; however, the location of the structures visible in the historic aerial photographs corresponds with Site Temp-1. Subsequent photographs show the project as a vacant desert landscape.

BFSA also requested a SLF search from the NAHC in 2023. The results were negative for the presence of any recorded Native American sacred sites or locations of religious or ceremonial importance within one mile of the project. All correspondence is provided in Appendix C.

1.5 Applicable Regulations

Resource importance is assigned to districts, sites, buildings, structures, and objects that possess exceptional value or quality illustrating or interpreting the heritage of San Bernardino County in history, architecture, archaeology, engineering, and culture. Several criteria are used in demonstrating resource importance. Specifically, the criteria outlined in CEQA, provide the guidance for making such a determination. The following sections detail the criteria that a resource must meet in order to be determined important.

1.5.1 California Environmental Quality Act

According to CEQA (§15064.5a), the term "historical resource" includes the following:

1) A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in the CRHR (Public Resources Code SS5024.1, Title 14 CCR. Section 4850 et seq.).
2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3) Any object, building, structure, site, area, place, record, or manuscript, which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (Public Resources Code SS5024.1, Title 14, Section 4852) including the following:

    a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    b) Is associated with the lives of persons important in our past;
    c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
    d) Has yielded, or may be likely to yield, information important in prehistory or history.

4) The fact that a resource is not listed in, or determined eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1[k] of

the Public Resources Code), or identified in a historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be a historical resource as defined in Public Resources Code Section 5020.1(j) or 5024.1.

According to CEQA (§15064.5b), a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. CEQA defines a substantial adverse change as:

1) Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.
2) The significance of a historical resource is materially impaired when a project:

    a) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in the CRHR; or
    b) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or,
    c) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

Section 15064.5(c) of CEQA applies to effects on archaeological sites and contains the following additional provisions regarding archaeological sites:

1) When a project will impact an archaeological site, a lead agency shall first determine whether the site is a historical resource, as defined in subsection (a).
2) If a lead agency determines that the archaeological site is a historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, Section 15126.4 of the guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.

3) If an archaeological site does not meet the criteria defined in subsection (a), but does meet the definition of a unique archaeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in Public Resources Code Section 21083.2 (c-f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
4) If an archaeological resource is neither a unique archaeological nor historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or Environmental Impact Report, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Sections 15064.5(d) and (e) contain additional provisions regarding human remains. Regarding Native American human remains, paragraph (d) states:

(d) When an Initial Study identifies the existence of, or the probable likelihood of, Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC as provided in Public Resources Code SS5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains, and any items associated with Native American burials with the appropriate Native Americans as identified by the NAHC. Action implementing such an agreement is exempt from:

1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5).
2) The requirements of CEQA and the Coastal Act.

2.0 RESEARCH DESIGN

The primary goal of the research design is to attempt to understand the way in which humans have used the land and resources within the project area through time, as well as to aid in the determination of resource significance. For the current project, the study area under investigation is southwestern San Bernardino County. The scope of work included the survey of the 81.2-acre study area and CEQA significance evaluations of any archaeological resources identified on the project that would be affected as a result of the development. Given the area involved and the recorded presence of archaeological sites, the research design for this project was focused upon realistic study options. Since the main objective of the investigation was to identify the presence of and potential impacts to cultural resources, the goal is not necessarily to answer wide-reaching theories regarding the development of early southern California, but to investigate the role and importance of the identified resources. Nevertheless, the assessment of the significance of a resource must take into consideration a variety of characteristics, as well as the ability of the resource to address regional research topics and issues. Several specific research questions were developed that could be used to guide an initial investigation of any observed cultural resources. The following research questions consider the small size and location of the project discussed above.

Research Questions:

- Can located cultural resources be associated with a specific time period, population, or individual?
- Do the types of any located cultural resources allow a site activity/function to be determined from a preliminary investigation? What are the site activities? What is the site function? What resources were exploited?
- How do located sites compare to others reported from different surveys conducted in the area?
- How do located sites fit existing models of settlement and subsistence for mountainous environments of the region?

Data Needs

At the survey level, the principal research objective is a generalized investigation of changing settlement patterns in both the prehistoric and historic periods within the study area. The overall goal is to understand settlement and resource procurement patterns of the project occupants. Therefore, adequate information on site function, context, and chronology from an archaeological perspective is essential for the investigation. The fieldwork and archival research were undertaken with the following primary research goals in mind:

1) To identify cultural resources occurring within the project;
2) To determine, if possible, site type and function, context of the resource(s), and chronological placement of each cultural resource identified;
3) To place each cultural resource identified within a regional perspective; and
4) To provide recommendations for the treatment of each cultural resource identified.

3.0 ANALYSIS OF PROJECT EFFECTS

The cultural resources assessment of the project consisted of an institutional records search, an archival research, an intensive cultural resource survey of the entire 81.2-acre study area, and the preparation of this technical report. This study was conducted in conformance with Section 21083.2 of the California Public Resources Code and CEQA. Statutory requirements of CEQA (Section 15064.5) were followed for the identification and evaluation of resources. Specific definitions for archaeological resource type(s) used in this report are those established by the State Historic Preservation Office (SHPO 1995).

3.1 Methods

3.1.1 Field Methodology

The updated cultural resources survey was conducted on June 4, 2025, under the direction of Principal Investigator Tracy A. Stropes, M.A., RPA. Methodology employed during the current investigation followed standard archaeological field procedures and was sufficient to accomplish a thorough survey of the project. The field methodology employed for the project included walking evenly spaced survey transects set approximately 10 to 15 meters apart while visually inspecting the ground surface. The archaeological survey was an intensive reconnaissance consisting of a series of survey transects across the project, the entirety of which was accessible. All potentially sensitive areas where cultural resources might be located were closely inspected. Photographs documenting survey areas and overall survey conditions were taken frequently.

3.2 Results of the Field Survey

The updated survey was conducted on June 4, 2025. The vegetation across the landscape primarily consisted of creosote bushes, wildflowers, and sage (Plates 3.2–1 and 3.2–2). Ground visibility during the survey was considered moderate to good. However, accumulated wind-swept soil hindered ground visibility around the bases of creosote bushes. No previously unidentified resources were identified during the survey. The two previously recorded historic trash scatters (Temp-1 and Temp-2) were located and found to be in the same condition as when previously evaluated by BFSA in 2023 (Plates 3.2–3 and 3.2–4, and Figures 3.2–1 and 3.2–2). As such, the updated survey has confirmed the 2023 results for the Joshua Tree Estates Project that no CRHR-eligible resources are located on the subject property.

Plate 3.2–1: Overview of the property, facing southeast.

Plate 3.2–2: Overview of the project, facing northwest.

Plate 3.2–3: Overview of Site Temp-1, facing west.

Plate 3.2–4: Overview of Site Temp-2, facing south.

Figure 3.2–1
Cultural Resource Location Map

(Deleted for Public Review; Bound Separately)

Figure 3.2–2
Cultural Resources Locations
Shown on an Aerial Photograph

(Deleted for Public Review; Bound Separately)

4.0 RECOMMENDATIONS

The results of the cultural resources survey update for the Joshua Tree Estates Project are consistent with the 2023 BFSA findings (Garrison 2023). Sites Temp-1 and Temp-2 within the subject property are not significant and ineligible for listing on the CRHR. Therefore, site-specific mitigation measures will not be required. However, based upon contraints resulting from partially limited ground visibility and the previously identified prehistoric and historic resources within the project vicinity, future grading within the subject property may impact cultural resources that have not been previously identified. Because the potential exists that inadvertent discoveries could be made during grading or earthwork, it is recommended that the project be conditioned with archaeological monitoring during ground-disturbing activities tied to the future residential development of the property. However, during grading, the consulting archaeologist shall have the authority to modify and reduce the monitoring program to either periodic spot-checks or suspension of the monitoring program if the potential for cultural resources appears to be less than anticipated. Should human remains be discovered, treatment of these remains shall follow California Public Resources Code 5097.9. Any human remains that are determined to be Native American shall be reported to the San Bernardino County Coroner and subsequently to the NAHC. These recommendations are consistent with the 2023 BFSA recommendations (Garrison 2023).

5.0 LIST OF PREPARERS AND ORGANIZATIONS CONTACTED

The archaeological survey updated program for the Joshua Tree Estates Project was directed by Principal Investigator Tracy A. Stropes, M.A., RPA. The report text was prepared by Andrew Garrison. Report graphics were provided by Emily Soong. Technical editing and report production were conducted by Danielle Del Castillo. The archaeological records search was conducted at the SCCIC at CSU Fullerton.

6.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Andrew J. Garrison — June 12, 2025

Andrew J. Garrison, M.A., RPA — Date
Senior Archaeologist

7.0 REFERENCES CITED

Bean, Lowell John
1978 Cahuilla. In *California*, edited by R.F. Heizer, pp. 575–587. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John and Charles R. Smith
1978 Serrano. In *California,* edited by R.F. Heizer, pp. 570–574. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John and Florence C. Shipek
1978 Luiseño. In *California*, edited by Robert F. Heizer, pp. 550–563. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Beattie, George W. and Helen P. Beattie
1951 *Heritage of the Valley: San Bernardino's First Century*. Biobooks, Oakland, California.

Benedict, Ruth Fulton
1924 A Brief Sketch of Serrano Culture. *American Anthropologist* 26(3).

Brigandi, Phil
1998 *Temecula: At the Crossroads of History*. Heritage Media Corporation, Encinitas, California.

Caughey, John W.
1970 *California: A Remarkable State's Life History.* 3rd ed. Prentice-Hall, Englewood Cliffs, New Jersey.

Chapman, Charles E.
1921 *A History of California: The Spanish Period*. The Macmillan Company, New York.

Chappell, Gordon
1971 National Register of Historic Places Inventory Nomination Form for the Desert Queen Mine, Joshua Tree National Monument, California. Online document. https://npgallery.nps.gov/NRHP/GetAsset/NRHP/76000216_text. Accessed May 2023.

Cook, Sherburne F.
1976 *The Conflict Between the California Indian and White Civilization*. University of California Press, Berkeley and Los Angeles, California.

Davis, Emma Lou
1978 *The Ancient Californians: Rancholabrean Hunters of the Mohave Lakes Country*. Natural History Museum of Los Angeles County, Science Series No. 29.

Dibblee, T.W., Jr.
2008 Geologic Map of Joshua Tree and Twentynine Palms 15-minute Quadrangles, San Bernardino and Riverside Counties, California. Dibblee Geology Center Map #DF-390, Minch, J.A., ed. Santa Barbara Museum of Natural History.

Drucker, Philip
1937 Culture Element Distributions: V. Southern California. *Anthropological Records* 1(1):1–52. University of California, Berkeley.

Erlandson, John M. and Roger H. Colten (editors)
1991 An Archaeological Context for Archaeological Sites on the California Coast. In *Hunter-Gatherers of Early Holocene Coastal California*, edited by J.M. Erlandson and R.H. Colten. Perspectives in California Archaeology, Volume 1, Institute of Archaeology, University of California, Los Angeles.

Fagan, Brian M.
1991 *Ancient North America: The Archaeology of a Continent*. Thames and Hudson, London.

Fife, Don
1988 *Mineral Wealth of Lucerne Valley.* California Geology, August:171-177.

Gallegos, Dennis
1985 Batiquitos Lagoon Revisited. In *Cultural Resource Management Casual Papers* 2(1). Department of Anthropology, San Diego State University.

2002 Southern California in Transition: Late Holocene Occupation of Southern San Diego County. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry Jones. Cotsen Institute of Archaeology, University of California, Los Angeles.

Garrison, Andrew J.
2023 Cultural Resources Assessment for the Joshua Tree Estates Project, Community of Joshua Tree, San Bernardino County, California. BFSA Environmental Services, a Perennial Company (BFSA), Poway, California. Unpublished report on file at the South Central Coastal Information Center at California State University, Fullerton.

Gunther, Jane Davies
1984 *Riverside County, California, Place Names: Their Origins and Their Stories.* Rubidoux Printing, Riverside, California.

Grubbs, Bruce
2007 Explore! Joshua Tree National Park: A Guide to Exploring the Desert Trails and Roads. Morris Book Publishing LLC.

Heizer, Robert F.
1978 Trade and Trails. In *California*, edited by Robert F. Heizer, pp. 690–693. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Kroeber, Alfred L.
1976 *Handbook of the Indians of California*. Reprinted. Dover Editions, Dover Publications, Inc., New York. Originally published 1925, Bulletin No. 78, U.S. Government Printing Office, Washington, D.C.

Martin, Paul S.
1967 Prehistoric Overkill. In *Pleistocene Extinctions: The Search for a Cause*, edited by Paul S. Martin and H.E. Wright. Yale University Press, New Haven, Connecticut.

1973 The Discovery of America. *Science* 179(4077):969–974.

Masters, Patricia M.
1983 Detection and Assessment of Prehistoric Artifact Sites off the Coast of Southern California. In *Quaternary Coastlines and Marine Archaeology: Towards the Prehistory of Land Bridges and Continental Shelves*, edited by Patricia M. Masters and Nicholas C. Fleming, pp. 189–213. Academic Press, London.

1994 *Archaeological Investigations at Five Sites on the Lower San Luis Rey River, San Diego County, California*, edited by Michael Moratto, pp. A1-A19. INFOTEC Research, Inc., Fresno, California and Gallegos and Associates, Pacific Palisades, California.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Moss, Madonna L. and Jon M. Erlandson
1995 Reflections on North American Pacific Coast Prehistory. *Journal of World Prehistory* 9(1):1–46.

National Park Service (NPS)
2019 History of Joshua Tree National Park. Online article. Https://www.nps.gov/jotr/learn/historyculture/parkhistory.htm Accessed May 2023.

Natural Resources Conservation Service (NRCS)
2022 Web Soil Survey. Electronic document, https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, accessed January 5, 2022.

Pourade, Richard F.
1961 *Time of the Bells*. The History of San Diego Volume 2. Union-Tribune Publishing Company, San Diego, California.

1963 The Silver Dons. In *The History of San Diego* (Volume 3). Union-Tribune Publishing Company, San Diego, California.

Rolle, Andrew F.
1969 *California: A History*. 2nd ed. Thomas Y. Crowell Company, New York.

Smith, Claire I.
1996 Joshua Tree… A Unique Village. Hi-Desert magazine. Online article. HISTORICAL HIGHLIGHT: THE HISTORY OF JOSHUA TREE PART 1 - Z107.7 FM Joshua Tree (z1077fm.com) Accessed May 2023.

State Historic Preservation Office (SHPO)
1995 *Instructions for Recording Historical Resources*. Office of Historic Preservation, Sacramento.

Strong, William Duncan
1971 Aboriginal Society in Southern California. Reprint of 1929 *Publications in American Archaeology and Ethnology* No. 26, University of California, Berkeley.

Sutton, Mark Q.
1988 *An Introduction to the Archaeology of the Western Mojave Desert, California.* Archives of California Prehistory Number 14. Coyote Press, Salinas, California.

Sutton, Mark Q., Mark E. Bagsall, Jill K. Gardner, and Mark W. Allen
2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 229-245. Altamira Press, a division of Rowman & Littlefield Publishers, Inc., Lanham, New York, Toronto, Plymouth (UK).

Warren, Claude N. and M.G. Pavesic
1963 Shell Midden Analysis of Site SDI-603 and Ecological Implications for Cultural Development of Batiquitos Lagoon, San Diego County, Los Angeles. *University of California, Los Angeles, Archaeological Survey Annual Report* 1960-1961:246–338.

APPENDIX A

Resumes of Key Personnel

Andrew J. Garrison, MA, RPA

Senior Archaeologist

BFSA Environmental Services, a Perennial Company
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: agarrison@bfsa.perennialenv.com

Education

Master of Arts, Public History, University of California, Riverside **2009**

Bachelor of Science, Anthropology, University of California, Riverside **2005**

Bachelor of Arts, History, University of California, Riverside **2005**

Professional Memberships

Register of Professional Archaeologists
Society for California Archaeology
Society for American Archaeology
California Council for the Promotion of History
Society of Primitive Technology
Lithic Studies Society
California Preservation Foundation
Pacific Coast Archaeological Society

Experience

Senior Archaeologist **June 2017–Present**
BFSA Environmental Services, a Perennial Company **Poway, California**

Project management of all phases of archaeological investigations for local, state, and federal agencies including National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) level projects interacting with clients, sub-consultants, and lead agencies. Supervise and perform fieldwork including archaeological survey, monitoring, site testing, comprehensive site records checks, and historic building assessments. Perform and oversee technological analysis of prehistoric lithic assemblages. Author or co-author cultural resource management reports submitted to private clients and lead agencies.

Senior Archaeologist and GIS Specialist **2009–2017**
Scientific Resource Surveys, Inc. **Orange, California**

Served as Project Archaeologist or Principal Investigator on multiple projects, including archaeological monitoring, cultural resource surveys, test excavations, and historic building assessments. Directed projects from start to finish, including budget and personnel hours proposals, field and laboratory direction, report writing, technical editing, Native American consultation, and final report submittal. Oversaw all GIS projects including data collection, spatial analysis, and map creation.

Preservation Researcher **2009**
City of Riverside Modernism Survey **Riverside, California**

Completed DPR Primary, District, and Building, Structure and Object Forms for five sites for a grant-funded project to survey designated modern architectural resources within the City of Riverside.

Information Officer **2005, 2008–2009**
Eastern Information Center (EIC), University of California, Riverside **Riverside, California**

Processed and catalogued restricted and unrestricted archaeological and historical site record forms. Conducted research projects and records searches for government agencies and private cultural resource firms.

Reports/Papers

2019 Cultural Resource Monitoring Report for the Pipeline Rehabilitation AP-1 Project, City of San Diego, California. Brian F. Smith and Associates, Inc.

2019 Cultural Resources Study for the Pioneer Redlands Project, San Bernardino County, California. Brian F. Smith and Associates, Inc.

2019 Cultural Resource Report for the U.S. Allied Carriers Project, City of Riverside, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 Phase I Cultural Resources Survey for the Go Fresh Gas Station Project, City of Moreno Valley, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Negative Cultural Resources Survey Report for the Barnaba Soccer Fields and Event Space Project, San Diego County, California.

2019 Phase I Cultural Resource Survey for the 2608 South Escondido Boulevard Project, City of Escondido. Brian F. Smith and Associates, Inc.

2019 A Negative Cultural Resources Survey Report for the Quail Ridge Project, San Diego County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resource Study for the Eastvale Self Storage Project, Eastvale, California. Brian F. Smith and Associates, Inc.

2019 A Class III Archaeological Study for the Tuscany Valley (TM 33725) Project National Historic Preservation Act Section 106 Compliance, Lake Elsinore, Riverside County, California. Contributing author. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Assessment for the Dudley Pomona Project, Pomona, California. Brian F. Smith and Associates, Inc.

2019 A Phase I and II Cultural Resources Assessment for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Assessment for the 10575 Foothill Boulevard Project, Rancho Cucamonga, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Survey for the IDI Rider 2 & 4 High Cube Warehouses and PVSD Channel Improvement Project, Perris, California. Brian F. Smith and Associates, Inc.

2019 Cultural Resources Study for the County Road and East End Avenue Project, City of Chino, San Bernardino County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Survey for the IPT Perris DC III Western/Nandina Project, Perris, California. Brian F. Smith and Associates, Inc.

2019 Phase II Cultural Resource Study for the McElwain Project, City of Murrieta, California. Contributing author. Brian F. Smith and Associates, Inc.

2019 A Section 106 (NHPA) Historic Resources Study for the McElwain Project, City of Murrieta, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Survey Report for the Commercial/Retail NWC Mountain and Lake Streets Project, City of Lake Elsinore, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Section 106 (NHPA) Historic Resources Study for the Twin Channel Project, City of San Bernardino, San Bernardino County, California. Brian F. Smith and Associates, Inc.

2019 Cultural Resources Study for the 10407 Elm Avenue Project, City of Fontana, San Bernardino County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resource Study for the Olivenhain Apartments Project, Encinitas, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resource Study for the Sanctuary Project, Encinitas, California. Brian F. Smith and Associates, Inc.

2019 A Cultural Resources Survey Report for the Borrego Springs 141 Project, San Diego County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Survey for the Natwar Project, Perris, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Survey for the Morningstar Marguerite Project, Mission Viejo, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Assessment for the Anza Baptist Church Project, Riverside County. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Assessment for the Inland Propane Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Survey for the First Industrial Wilson Avenue Project, Perris, California. Brian F. Smith and Associates, Inc.

2018 A Class III Historic Resource Study for Phase 2 of the Atwell Project for Section 106 Compliance, Banning, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resource Monitoring Report for the Sewer Group 818 Project, City of San Diego. Brian F. Smith and Associates, Inc.

2018 Phase I Cultural Resource Survey for the Stone Residence Project, 1525 Buckingham Drive, La Jolla, California 92037. Brian F. Smith and Associates, Inc.

2018 A Phase I Cultural Resources Assessment for the Hanna Banning Project, Banning, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resources Negative Findings for the SNC Mixed Use Project, San Diego County, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resources Study for the Perrin Oak Ranch Winery Project, San Diego County, California. Brian F. Smith and Associates, Inc.

2018 Phase I Cultural Resource Survey for the Stemley 42nd Street Project, San Diego, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resource Monitoring Report for the 320 West Cedar Street Project, San Diego, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resource Monitoring Report for the 8352 La Jolla Shores Drive Project, San Diego, California. Brian F. Smith and Associates, Inc.

2018 Phase I Cultural Resources Survey of APNs 316-210-032 and -033, City of Moreno Valley, County of Riverside. Contributing author. Brian F. Smith and Associates, Inc.

2018 A Cultural Resources Assessment for TR 37177, City of Riverside, Riverside County, California. Brian F. Smith and Associates, Inc.

2018 A Phase I Cultural Resources Assessment for the Seaton Commerce Center Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Marbella Villa Project, City of Desert Hot Springs, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 Phase I Cultural Resources Survey for TTM 37109, City of Jurupa Valley, County of Riverside. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Survey for the Jefferson & Ivy Project, City of Murrieta, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Nuevo Dollar General Store Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resource Study for the Westmont Project, Encinitas, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Winchester Dollar General Store Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 Phase I Cultural Resource Assessment for TTM 31810 (42.42 acres) Predico Properties Olive Grove Project. Scientific Resource Surveys, Inc.

2016 John Wayne Airport Jet Fuel Pipeline and Tank Farm Archaeological Monitoring Plan. Scientific Resource Surveys, Inc. On file at the County of Orange, California.

2016 Phase I Cultural Resources Assessment: All Star Super Storage City of Menifee Project, 2015-156. Scientific Resource Surveys, Inc. On file at the Eastern Information Center, University of California, Riverside.

2016 Historic Resource Assessment for 220 South Batavia Street, Orange, CA 92868 Assessor's Parcel Number 041-064-4. Scientific Resource Surveys, Inc. Submitted to the City of Orange as part of

Mills Act application.

2015 Historic Resource Report: 807-813 Harvard Boulevard, Los Angeles. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2015 Exploring a Traditional Rock Cairn: Test Excavation at CA-SDI-13/RBLI-26: The Rincon Indian Reservation, San Diego County, California. Scientific Resource Surveys, Inc.

2015 Class III Scientific Resource Surveys, Inc. Survey for The Lynx Cat Granite Quarry and Water Valley Road Widening Project County of San Bernardino, California, Near the Community of Hinkley. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2014 Archaeological Phase I: Cultural Resource Survey of the South West Quadrant of Fairview Park, Costa Mesa. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2014 Archaeological Monitoring Results: The New Los Angeles Federal Courthouse. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2012 Bolsa Chica Archaeological Project Volume 7, Technological Analysis of Stone Tools, Lithic Technology at Bolsa Chica: Reduction Maintenance and Experimentation. Scientific Resource Surveys, Inc.

2010 Phase II Cultural Resources Report Site CA-RIV-2160 PM No. 35164. Scientific Resource Surveys, Inc. On file at the Eastern Information Center, University of California, Riverside.

2009 Riverside Modernism Context Survey, contributing author. Available online at the City of Riverside.

Presentations

2017 "Repair and Replace: Lithic Production Behavior as Indicated by the Debitage Assemblage from CA-MRP-283 the Hackney Site." Presented at the Society for California Archaeology Annual Meeting, Fish Camp, California.

2016 "Bones, Stones, and Shell at Bolsa Chica: A Ceremonial Relationship?" Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Markers of Time: Exploring Transitions in the Bolsa Chica Assemblage." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Dating Duress: Understanding Prehistoric Climate Change at Bolsa Chica." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2015 "Successive Cultural Phasing Of Prehistoric Northern Orange County, California." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Southern California Cogged Stone Replication: Experimentation and Results." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Prehistoric House Keeping: Lithic Analysis of an Intermediate Horizon House Pit." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Pits and Privies: The Use and Disposal of Artifacts from Historic Los Angeles." Presented at the Society for California Archaeology Annual Meeting, Redding, California.

2015 "Grooving in the Past: A Demonstration of the Manufacturing of OGR beads and a look at Past SRS, Inc. Replicative Studies." Demonstration of experimental manufacturing techniques at the January meeting of The Pacific Coast Archaeological Society, Irvine, California.

2014 "From Artifact to Replication: Examining *Olivella* Grooved Bead Manufacturing." Presented at the Society for California Archaeology Annual Meeting, Visalia, California.

2014 "New Discoveries from an Old Collection: Comparing Recently Identified OGR Beads to Those Previously Analyzed from the Encino Village Site." Presented at the Society for California Archaeology Annual Meeting, Visalia, California.

2012 Bolsa Chica Archaeology: Part Seven: Culture and Chronology. Lithic demonstration of experimental manufacturing techniques at the April meeting of The Pacific Coast Archaeological Society, Irvine, California.

2012 "Expedient Flaked Tools from Bolsa Chica: Exploring the Lithic Technological Organization." Presented at the Society for California Archaeology Annual Meeting, San Diego, California.

2012 "Utilitarian and Ceremonial Ground Stone Production at Bolsa Chica Identified Through Production Tools." Presented at the Society for California Archaeology Annual Meeting, San Diego, California.

2012 "Connecting Production Industries at Bolsa Chica: Lithic Reduction and Bead Manufacturing." Presented at the Society for California Archaeology Annual Meeting, San Diego, California.

2011 Bolsa Chica Archaeology: Part Four: Mesa Production Industries. Co-presenter at the April meeting of The Pacific Coast Archaeological Society, Irvine, California.

2011 "Hammerstones from Bolsa Chica and Their Relationship towards Site Interpretation." Presented at the Society for California Archaeology Annual Meeting, Rohnert Park, California.

2011 "Exploring Bipolar Reduction at Bolsa Chica: Debitage Analysis and Replication." Presented at the Society for California Archaeology Annual Meeting, Rohnert Park, California.

APPENDIX B

Archaeological Records Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX C

NAHC Sacred Lands File Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX D

Confidential Maps

(Deleted for Public Review; Bound Separately)

CULTURAL RESOURCES ASSESSMENT FOR THE JOSHUA TREE ESTATES PROJECT

COMMUNITY OF JOSHUA TREE, SAN BERNARDINO COUNTY, CALIFORNIA

APN 0605-051-01

Lead Agency:
County of San Bernardino
385 North Arrowhead Avenue
San Bernardino, California 92415

Preparer:
BFSA Environmental Services,
a Perennial Company
14010 Poway Road, Suite A
Poway, California 92064

Project Proponent:
Home Paradise Realty Group, Inc.
10392 Klingerman Street, Suite C
El Monte, California 91733

May 31, 2023

BFSA Environmental Services
A Perennial Company

Archaeological Database Information

Author:	Andrew J. Garrison, M.A., RPA
Consulting Firm:	BFSA Environmental Services, a Perennial Company 14010 Poway Road, Suite A Poway, California 92064 (858) 679-8218
Client/Project Proponent:	Home Paradise Realty Group, Inc. 10392 Klingerman Street, Suite C El Monte, California 91733
Report Date:	May 31, 2023
Report Title:	Cultural Resources Assessment for the Joshua Tree Estates Project, Community of Joshua Tree, San Bernardino County, California
Type of Study:	Phase I and II Cultural Resources Survey
USGS Quadrangle:	Section 20, Township 1 North, Range 7 East of *Joshua Tree North*, *California* (7.5-minute) USGS Quadrangle
Acreage:	82.1 acres
Key Words:	Survey; Phase II testing and evaluation; historic cistern and refuse scatter (Site Temp-1); historic refuse scatter (Site Temp-2); no CRHR-eligible resources; monitoring of future grading recommended.

Table of Contents

Section	Description	Page
MANAGEMENT SUMMARY/ABSTRACT		*iv*
1.0	INTRODUCTION	1.0–1
	1.1 Project Description	1.0–1
	1.2 Environmental Setting	1.0–1
	1.3 Cultural Setting	1.0–5
	1.3.1 Prehistoric Period	1.0–5
	1.3.2 Historic Period	1.0–10
	1.4 Results of the Archaeological Records Search	1.0–14
	1.5 Applicable Regulations	1.0–15
	1.5.1 California Environmental Quality Act	1.0–15
2.0	RESEARCH DESIGN	2.0–1
3.0	ANALYSIS OF PROJECT EFFECTS	3.0–1
	3.1 Methods	3.0–1
	3.1.1 Field Methodology	3.0–1
	3.1.2 Test Methodology	3.0–1
	3.1.3 Laboratory and Cataloging Procedures	3.0–2
	3.2 Results of the Field Survey	3.0–4
	3.3 Results of the Significance Testing	3.0–9
	3.3.1 Site Temp-1	3.0–9
	3.3.2 Site Temp-2	3.0–19
4.0	RECOMMENDATIONS	4.0–1
5.0	LIST OF PREPARERS AND ORGANIZATIONS CONTACTED	5.0–1
6.0	REFERENCES CITED	6.0–1

List of Appendices

Appendix A – Resumes of Key Personnel
Appendix B – Site Record Forms*
Appendix C – Archaeological Records Search Results*
Appendix D – NAHC Sacred Lands File Search Results*
Appendix E – Artifact Catalogs
Appendix F – Confidential Maps*

**Deleted for public review and bound separately in the Confidential Appendix*

List of Figures

Figure	Description	Page
Figure 1.1–1	General Location Map	1.0–2
Figure 1.1–2	Project Location Map (USGS)	1.0–3
Figure 1.1–3	Project Development Map	1.0–4
Figure 3.2–1	Cultural Resources Location Map*	3.0–7
Figure 3.2–2	Cultural Resources Locations Shown on an Aerial Photograph*	3.0–8
Figure 3.3–1	Excavation Location Map Site, Temp-1*	3.0–12
Figure 3.3–2	Excavation Location Map Site, Temp-2*	3.0–20
Figure 4.0–1	Cultural Resources Shown on the Joshua Tree Estates Subdivision Map*	4.0–2

**Deleted for public review and bound separately in the Confidential Appendix*

List of Plates

Plate	Description	Page
Plate 3.2–1	Overview of the project, facing east	3.0–5
Plate 3.2–2	Overview of the project, facing west	3.0–5
Plate 3.2–3	Overview of Site Temp-1, facing northeast	3.0–6
Plate 3.2–4	Overview of Site Temp-2, facing north	3.0–6
Plate 3.3–1	Overview of Site Temp-1, facing east	3.0–9
Plate 3.3–2	Overview of the cistern at Site Temp-1, facing east	3.0–10
Plate 3.3–3	Overview of Site Temp-1, facing west	3.0–11
Plate 3.3–4	Close-Up view of the historic artifacts at Site Temp-1	3.0–11
Plate 3.3–5	Overview of Site Temp-2, facing northeast	3.0–19

List of Tables

Table	Description	Page
Table 1.4–1	Cultural Resources Within One Mile of the Project	1.0–14
Table 3.3–1	Surface Collection Data for Site Temp-1	3.0–13
Table 3.3–2	Shovel Test Excavation Data for Site Temp	3.0–15

List of Tables (continued)

Table	Description	Page
Table 3.3–3	Cultural Material Recovered from Site Temp-1	3.0–17
Table 3.3–4	Functional Categories Represented by Cultural Materials Recovered From Site Temp-1	3.0–17
Table 3.3–5	Temporally Diagnostic Consumer Items Recovered from Site Temp-1	3.0–18
Table 3.3–6	Surface Collection Data for Site Temp-2	3.0–21
Table 3.3–7	Shovel Test Excavation Data for Site Temp-2	3.0–22
Table 3.3–8	Cultural Materials Recovered from Site Temp-2	3.0–23
Table 3.3–9	Functional Categories Represented by Cultural Materials Recovered From Site Temp-2	3.0–23
Table 3.3–10	Temporally Diagnostic Consumer Items Recovered from Site Temp-2	3.0–24

MANAGEMENT SUMMARY/ABSTRACT

In response to a request by the applicant, a cultural resources assessment was conducted by BFSA Environmental Services, a Perennial Company (BFSA), for the Joshua Tree Estates Project. The project consists of a proposed subdivision of an 82.1-acre parcel (Assessor's Parcel Number [APN] 0605-051-01) bound by East Broadway, Laferney Avenue, and Sunever Road, in the Joshua Tree area of San Bernardino County, California. The project is situated within Section 20, Township 1 North, Range 7 East, as shown on the United States Geological Survey (USGS) (7.5-minute) *Joshua Tree North*, *California* topographic quadrangle. The property is currently vacant.

The purpose of this investigation was to locate and record any cultural resources within the project and subsequently evaluate any resources as part of the County of San Bernardino environmental review process conducted in compliance with the California Environmental Quality Act (CEQA). The archaeological investigation of the project also includes the review of an archaeological records search performed at the South Central Coastal Information Center (SCCIC) at California State University, at Fullerton (CSU Fullerton) in order to assess previous archaeological studies and identify any previously recorded archaeological sites within the project or in the immediate vicinity. A Sacred Lands File (SLF) search was also requested from the Native American Heritage Commission (NAHC).

The review of the archaeological records search identified seven cultural resources within one mile of the project, none of which are located within the subject property. The resources identified during the records search include three prehistoric isolates, one multicomponent site, one historic trash scatter, and two historic isolates. A review of historic maps and aerial photographs (1953 through 2021) show that by 1953 one structure is located within the northeastern portion of the property just south of East Broadway. By 1970, an additional structure, possibly a shed, is also visible at this location. These structures are visible at this location through 1989. Subsequent photographs show the project as a vacant desert landscape.

The survey of the property was conducted on March 26, 2023. Survey conditions were generally moderate to good, and the survey did not result in the identification of any prehistoric resources within the project; however, the survey did identify two historic archaeological sites (Temp-1 and Temp-2). Site Temp-1 consists of a cistern and a historic artifact scatter at the location where structures are visible on the aerial photographs between 1953 and 1989. Site Temp-2 is a historic artifact scatter just northwest of the intersection of 3rd Street and Sunever Road. The site assemblage primarily consists of cans, metal, and glass fragments.

In order to accurately evaluate the identified archaeological sites and to assess the project's potential impacts to these resources, BFSA conducted a Phase II testing and evaluation study at Sites Temp-1 and Temp-2 on May 3, 2023. This included the detailed recordation of each site on Department of Parks and Recreation (DPR) site record forms (see Appendix B), collection of a representative sample of surface artifacts, and shovel test pit (STP) excavations at each of the sites.

The artifact assemblage for Site Temp-1 was found to date between the late 1960s and 1970s. The assemblage for site Temp-2 was found to date between the late 1950s and 1960s. No significant intact cultural materials were recovered from the surface examinations or subsurface tests. Because the Phase II testing program did not produce any significant surface or subsurface artifact concentrations, sites Temp-1 and Temp-2 were determined to be not CEQA-significant and not eligible for listing on the California Register of Historical Resources (CRHR).

The Joshua Tree Estates Project will result in direct impacts to sites Temp-1 and Temp-2, which have both been evaluated as not CEQA-significant and not eligible for listing on the CRHR. As such, no site-specific mitigation measures are recommended. However, the devleopment of the subject property may impact cultural resources that have not been previously identified. Therefore, it is recommended that the project be conditioned with archaeological monitoring during ground-disturbing activities tied to the future residential development of the property. A copy of this report will be permanently filed with the SCCIC at CSU Fullerton. All notes, photographs, and other materials related to this project will be curated at the archaeological laboratory of BFSA in Poway, California.

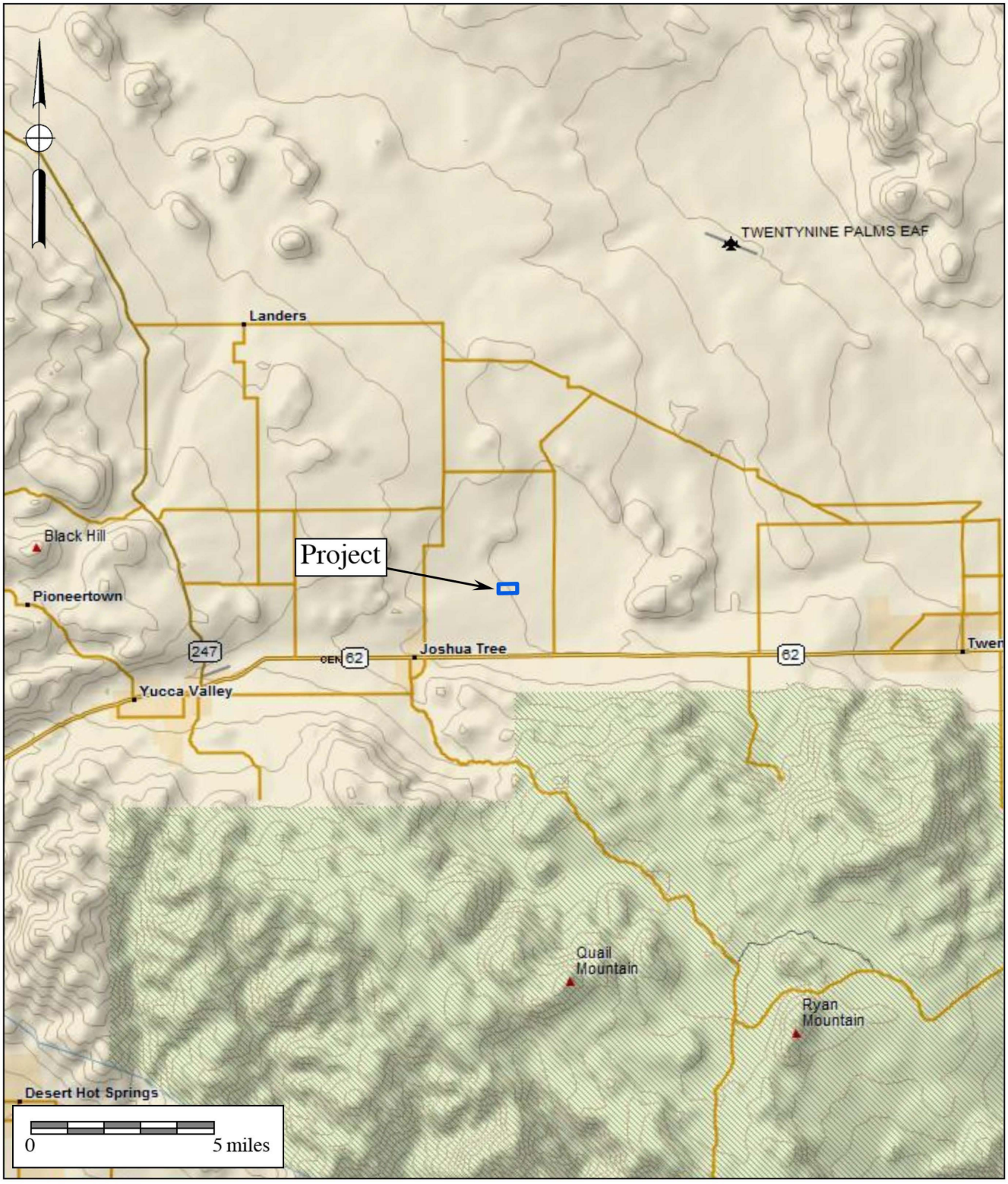
1.0 INTRODUCTION

1.1 Project Description

The archaeological assessment for the Joshua Tree Estates Project was conducted to comply with CEQA and the County of San Bernardino environmental requirements. The 82.1-acre project is bound by East Broadway, Laferney Avenue, and Sunever Road in the Joshua Tree area of San Bernardino County, California (APN 0605-051-01) (Figure 1.1–1). The project is situated within Section 20, Township 1 North, Range 7 East, as shown on the USGS *Joshua Tree North, California* topographic quadrangle (Figure 1.1–2). The project proposes the subdivision of the property into 29 residential lots ranging in size between 2.01 and 2.36 acres, along with 11.00 acres dedicated for road development and improvements (Figure 1.1–3). The decision to request this investigation was based upon the cultural resource sensitivity of the locality as suggested by known site density and predictive modeling. Sensitivity for cultural resources in a given area is usually indicated by known settlement patterns, which in southwestern San Bernardino County were focused around freshwater resources and a food supply.

1.2 Environmental Setting

The Joshua Tree Estates Project is located in the Mojave Desert Geomorphic Province of southern California. This area contains isolated mountain ranges separated by expanses of desert plains. The project is located within the Coyote Valley, south of the Bunker Mountains, east of the Bartlett Mountains, west of Coyote Lake, and north of Joshua Tree National Monument. A northeast-to-southwest trending ephemeral wash traverses the property. As shown on the geologic map by Thomas Dibblee (2008), most of the project area is composed of Holocene-aged alluvium. The Holocene alluvium is comprised of gravel, sand, silt, and clay deposited within the valley in the last 11,700 years. The southwestern corner of the project is mapped as Pleistocene-aged older alluvium, consisting of gravels and sand. The older alluvial deposits underlie the younger Holocene deposits at the project at unknown but likely variable depths. The age of the older alluvial deposits is estimated anywhere between 11,700 years to perhaps as much as two million years old. Soils within the project have not been mapped by the National Resources Conservation Service Web Soil Survey (NRCS 2019). Elevations within the project range from approximately 2,475 to 2,519 feet above mean sea level.

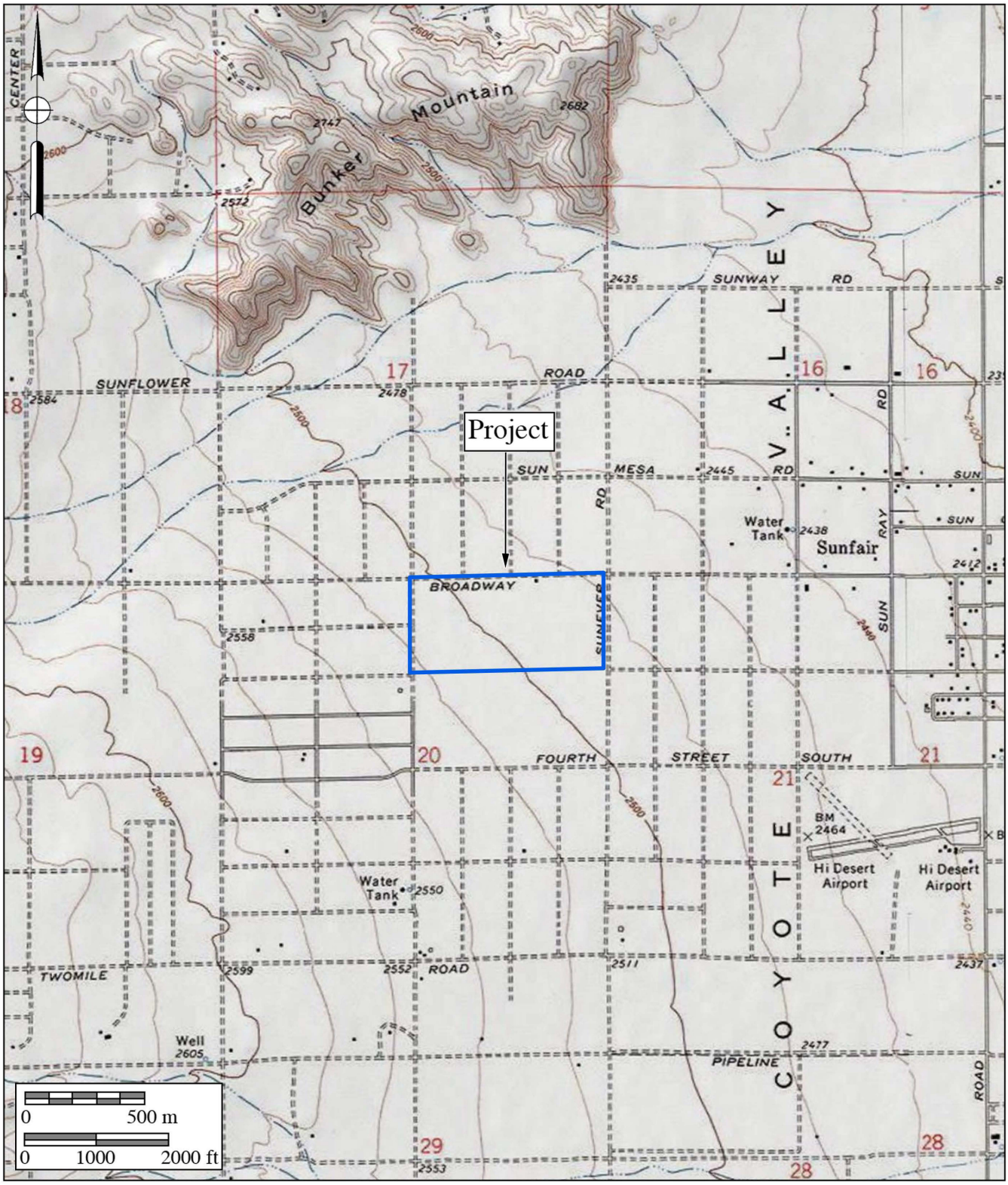


BFSA Environmental Services
A Perennial Company

Figure 1.1–1
General Location Map

The Joshua Tree Estates Project

DeLorme (1:250,000 series)

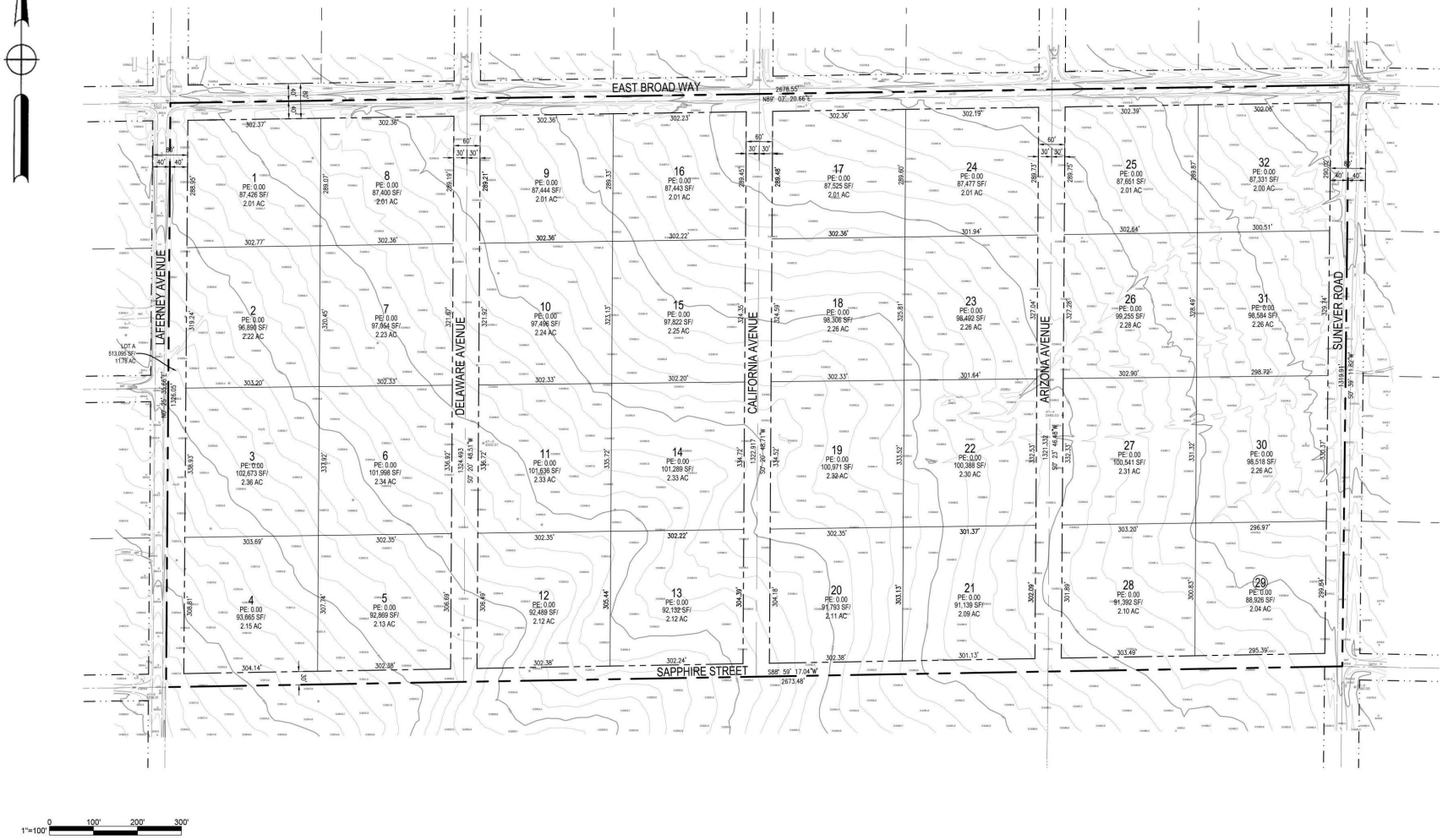


BFSA Environmental Services
A Perennial Company

Figure 1.1–2
Project Location Map

The Joshua Tree Estates Project

USGS *Joshua Tree North* Quadrangle (7.5-minute series)



BFSA Environmental Services
A Perennial Company

Figure 1.1–3
Project Development Map
The Joshua Tree Estates Project

1.3 Cultural Setting

The subject property is located within the traditional territory primarily associated with the Serrano. Although the Mojave Desert is an area believed to have had limited prehistoric subsistence resources, it has historically supported a long and occasionally dense population. Evidence of villages and camps, burials, quarries, rock features, and bedrock mortars has been documented at archaeological sites across the desert, some of which contain evidence of a lengthy prehistoric time span. Although early archaeological remains are not found frequently, when they are, they are generally located along the margins of former pluvial lakes or in areas of dune deflation. In contrast, artifacts on the desert floor may be sparse, widely scattered, and mixed with the desert pavements. For the region, archaeologists have reached a broad consensus regarding the general cultural chronology. The identified sequence includes the Paleo Indian Period, the Lake Mojave Period, the Pinto Period, the Gypsum Period, the Saratoga Springs Period, and the Ethnohistoric Period.

1.3.1 Prehistoric Period

Paleo Indian Period (12,000 to circa 10,000 YBP)

Archaeologically, the Paleo Indian Period is associated with the terminus of the late Pleistocene (12,000 to 10,000 YBP). The environment during the late Pleistocene was cool and moist, which allowed for glaciation in the mountains and the formation of deep, pluvial lakes in the deserts and basin lands (Moratto 1984). However, by the terminus of the late Pleistocene, the climate became warmer, which caused the glaciers to melt, sea levels to rise, greater coastal erosion, large lakes to recede and evaporate, extinction of Pleistocene megafauna, and major vegetation changes (Moratto 1984; Martin 1967, 1973; Fagan 1991). The coastal shoreline at 10,000 YBP, depending upon the particular area of the coast, was near the 30-meter isobath, or two to six kilometers further west than its present location (Masters 1983).

Paleo Indians were likely attracted to multiple habitat types, including mountains, marshlands, estuaries, and lakeshores. These people likely subsisted using a more generalized hunting, gathering, and collecting adaptation utilizing a variety of resources including birds, mollusks, and both large and small mammals (Erlandson and Colten 1991; Moratto 1984; Moss and Erlandson 1995).

Lake Mojave Period (Late Pleistocene: 10,000 to 7,000 YBP)

The earliest documented evidence of human occupation in the Mojave Desert and surrounding areas comes from the Paleo Indian Period, a cultural expression referred to as the Western Pluvial Lakes Tradition (WPLT). The WPLT occurred in the western Great Basin and covered an area that stretched from the now arid lands of southern California to Oregon. A cultural adaptation to pluvial conditions (e.g., lakes, marshes, and grasslands) flourished for thousands of years after approximately 9000 B.C., but disappeared in response to the warming and drying trends of the Altithermal climatic period (Moratto 1984). One of the most well known expressions of the

WPLT is the Lake Mojave Complex, which is thought to have covered a vast area including parts of the southwestern Great Basin and the Mojave Desert, and may have reached as far south as the San Diego area. Artifacts indicative of the Lake Mojave Complex include foliated points and knives, Lake Mojave points, Silver Lake points, and flaked-stone crescents. Similar artifacts have been subsequently recorded along the shoreline of many other pluvial lakes in the Mojave Desert. Archaeological studies by Mark Sutton (1988) suggested that, at the time of the Lake Mojave Complex, much of Antelope and Fremont valleys may have been covered by Pleistocene Lake Thompson. In her 1978 work, Davis (1978) argues that the wetlands generated as a result of such Pliestocene lakes would have been a great attraction to the region's early occupants. This would result in an adaptive strategy that was more generalized, focusing on hunting and the overall exploitation of wetland resources. In general, it is clear that cultures across California adapted to wetland environments generated by pluvial lake ecological systems (Moratto 1984).

Pinto Period (7,000 to 4,000 YBP)

The Pinto Period dates to the end of the Pleistocene, when the severe and dramatic environmental change from pluvial to arid conditions began (Moratto 1984). Pinto Period sites are found mostly near ephemeral lakes and now dry streams and springs, suggesting that as the region began to dry, new subsistence adaptations were necessary. Projectile points associated with the Pinto Period are characterized as larger atlatl dart points, as opposed to arrowhead points, which were introduced later. This period has been described as a highly mobile desert economy, with an emphasis on hunting, supplemented by the use of processed seeds (Moratto 1984). However, the collections believed to represent the Pinto Period are largely lacking in well-developed milling technologies according to Moratto (1984). Pinto Period artifacts have been interpreted as indications of temporary or seasonal occupations by small groups of people. Sites of this period are generally small in scale and are typically absent of a developed midden. More recent studies (Sutton et al. 2007) suggest that the Pinto Period may have actually started in the early Holocene, overlapping the Lake Mojave Period. A series of radiocarbon dates from Little Lake, Pinto Basin, Twentynine Palms and Fort Irwin suggest Pinto sites with antiquity of upwards of 9,000 years (Sutton et al. 2007), indicating these sites may be of greater antiquity than previously suggested.

Gypsum Period (4,000 to 1,500 YBP)

The presence of Humboldt Concave Base, Gypsum Cave, Elko Eared, or Elko corner-notched points are believed to be indicative of the Gypsum Period (radiocarbon dated from 4,000 to 1,500 YBP). The Gypsum Period reflects a more intensive desert occupation as temperatures began to regulate during the First Neoglacial episode at the beginning of the late Holocene (Warren 1984; Sutton et al. 2007). During this time, indications of trade with coastal populations are evidenced by the presence of shell beads in the archaeological record. An increase in milling stones and manos has been found in association with this period, which indicates an increased use

of hard seeds (Moratto 1984; Warren 1984; Sutton et al. 2007). In comparison to sites from the preceding periods, Gypsum Period sites are generally smaller, higher in frequency, and distributed across a range of environments. Further, Gypsum Period sites also display evidence of exploitation of *artiodactyls*, rabbits, and rodents, as well as a wide range of seeds. Adaptations resulting from better adapted technologies combined with what was likely more complex social organization likely facilitated the ease of adaptation to the warming and drying conditions that initiated circa 2,000 years ago. The continued use of the region during the Gypsum Period indicates an overall more successful adaptation to the warm and dry conditions during this period (Warren 1984; Sutton et al. 2007).

Several scholars associate this period with the division of the Uto-Aztecan language, approximately 3,000 to 2,500 years ago (Moratto 1984; Warren 1984; Sutton et al. 2007). The major language groups that emerged from this division are Numic, spoken by the Kawaiisu and Piute; Takic, spoken by the Kitanemuk, Serrano, Gabrielino, and other southern California Shoshonean speakers; Hopic, spoken in the southwest; and Tubatulabalic, spoken by the Tubatulabal in the southern Sierra Nevada Mountains. A shift in settlement patterns toward a more sedentary lifestyle occurred during this period, characterized by the emergence of large permanent or semi-permanent village sites and associated cemeteries.

Saratoga Springs Period (1,500 to 800 YBP)

The Saratoga Springs Period is characterized by a transition from larger dart points to smaller arrow points. The presence of arrow points suggest that the bow and arrow were introduced to the Mojave Desert during the Saratoga Springs Period. This, combined with evidence from rock art motifs, leads scholars to argue for a shift from atlatls to use of the bow and arrow either during the end of the Gypsum Period or the beginning of the Saratoga Springs Period. This technological advancement likely improved overall hunting efficiency and possibly the carrying capacity for local population (Warren 1984). This in turn may have resulted in a significant increase in population as suggested by archaeological data. During this period, the development of large village sites with cemeteries and well-developed middens indicate long-term occupations in comparison to previous periods. This period saw an increase in trade with Arizona and other areas of the southwest. Evidence in the archaeological record shows that Brown and Buff wares (pottery styles), characteristic of Arizona, made their way to the California desert by 900 A.D. It is also believed that the Anasazi mined turquoise in the eastern California desert about this time. While the presence of Hakataya influence may have extended as far north and west as the eastern Antelope Valley (Warren 1984), influence in the western Mojave appear to have been minimal. During the second half of the Saratoga Springs Period, the rise in temperatures and return to xeric conditions around A.D. 700 likely led to population decline, and eventually the terminus of the Saratoga Springs complex circa A.D. 1100 (Sutton et al. 2007).

Ethnohistoric Period (800 YPB to the Time of European Contact)

Prior to European presence in North America, Native American groups subsisted along the shores of the no longer extant lakes of the Great Basin region that covered the major portion of the present-day Mojave Desert. It was along these shores that Native Americans made their homes, produced their tools, and left an indelible mark upon the landscape. However, by the time the first Spanish explorers ventured into what is now southern California in 1769, the pluvial lakes had long since vanished, leaving the Mojave River to support primarily the Paiute and the Mohave tribes. Ethnohistoric and ethnographic evidence indicates that prior to the arrival of the Spanish missionaries, the area around the project was inhabited by the Serrano (Moratto 1984; Sutton et al. 2007). Ethnographic data for the Serrano is presented below.

Serrano: An Archaeological and Ethnographic Perspective

Aboriginally, the Serrano occupied an area east of present-day Los Angeles. According to Bean and Smith (1978b), definitive boundaries are difficult to place for the Serrano due to their sociopolitical organization and a lack of reliable data:

> The Serrano were organized into autonomous localized lineages occupying definite, favored territories, but rarely claiming any territory far removed from the lineage's home base. Since the entire dialectical group was neither politically united nor amalgamated into supralineage groups, as many of their neighbors were, one must speak in terms of generalized areas of usage rather than pan-tribal holdings. (Strong [1971] in Bean and Smith 1978b)

However, researchers place the Serrano in the San Bernardino Mountains, east of Cajon Pass, and at the base of and north of the mountains near Victorville, east to Twentynine Palms, and south to the Yucaipa Valley (Bean and Smith 1978b). Serrano has been used broadly for languages in the Takic family including Serrano, Kitanemuk, Vanyume, and Tataviam.

Subsistence and Settlement

Serrano village locations were typically located near water sources. Individual family dwellings were likely circular, domed structures. Daily household activities would either take place outside of the house out in the open, or under a ramada constructed of a thatched willow pole roof held up by four or more poles inserted into the ground. Families could consist of a husband, wife/wives, unmarried female children, married male children, the husband's parents, and/or widowed aunts and uncles. Rarely, an individual would occupy his own house, typically in the mountains. Serrano villages also included a large ceremonial house where the lineage leader would live, which served as the religious center for lineages or lineage-sets, granaries, and sweathouses (Bean and Smith 1978b).

The Serrano were primarily hunters and gatherers. Vegetal staples varied with locality. Acorns and piñon nuts were found in the foothills, and mesquite, yucca roots, cacti fruits, and piñon nuts were found in or near the desert regions. Diets were supplemented with other roots, bulbs, shoots, and seeds (Heizer 1978). Deer, mountain sheep, antelopes, rabbits, and other small rodents were among the principal food packages. Various game birds, especially quail, were also hunted. The bow and arrow were used for large game, while smaller game and birds were killed with curved throwing sticks, traps, and snares. Occasionally, game was hunted communally, often during mourning ceremonies (Benedict 1924; Drucker 1937; Heizer 1978). Earth ovens were used to cook meat, bones were boiled to extract marrow, and blood was either drunk cold or cooked to a thicker consistency and then eaten. Some meat and vegetables were sun-dried and stored. Food acquisition and processing required the manufacture of additional items such as knives, stone, or bone scrapers, pottery trays and bowls, bone or horn spoons, and stirrers. Mortars, made of either stone or wood, and metates were also manufactured (Strong 1971; Drucker 1937; Benedict 1924).

Social Organization

The Serrano were part of "exogamous clans, which in turn were affiliated with one of two exogamous moieties, *tuk^{w}utam* (Wildcat) and *wahiʔiam* (Coyote)" (Bean and Smith 1978b). According to Strong (1971), details such as number, structure, and function of the clans are unknown. Instead, he states that clans were not political, but were rather structured based upon "economic, marital, or ceremonial reciprocity, a pattern common throughout Southern California" (Bean and Smith 1978b). The Serrano formed alliances amongst their own clans and with Cahuilla, Chemehuevi, Gabrielino, and Cupeño clans (Bean and Smith 1978b). Clans were large, autonomous, political, and landholding units formed patrilineally, with all males descending from a common male ancestor, including all wives and descendants of the males. However, even after marriage, women would still keep their original lineage, and would still participate in those ceremonies (Bean and Smith 1978b).

According to Bean and Smith (1978b), the cosmogony and cosmography of the Serrano are very similar to those of the Cahuilla:

> There are twin creator gods, a creation myth told in "epic poem" style, each local group having its own origin story, water babies whose crying foretells death, supernatural beings of various kinds and on various hierarchically arranged power-access levels, an Orpheus-like myth, mythical deer that no one can kill, and tales relating the adventures (and misadventures) of Coyote, a tragicomic trickster-transformer culture hero. (Bean [1962-1972] and Benedict [1924] in Bean and Smith 1978b)

The Serrano had a shaman, a person who acquired their powers through dreams, which were induced through ingestion of the hallucinogen datura. The shaman was mostly a curer/healer, using herbal remedies and "sucking out the disease-causing agents" (Bean and Smith 1978b).

Material Culture

The Serrano were very similar technologically to the Cahuilla. In general, manufactured goods included baskets, some pottery, rabbit-skin blankets, awls, arrow straighteners, sinew-backed bows, arrows, fire drills, stone pipes, musical instruments (rattles, rasps, whistles, bull-roarers, and flutes), feathered costumes, mats for floor and wall coverings, bags, storage pouches, cordage (usually comprised of yucca fiber), and nets (Heizer 1978).

1.3.2 Historic Period

Traditionally, the history of the state of California has been divided into three general periods: the Spanish Period (1769 to 1821), the Mexican Period (1822 to 1846), and the American Period (1848 to present) (Caughey 1970). The American Period is often further subdivided into additional phases: the nineteenth century (1848 to 1900), the early twentieth century (1900 to 1950), and the Modern Period (1950 to present). From an archaeological standpoint, all of these phases can be referred to together as the Ethnohistoric Period. This provides a valuable tool for archaeologists, as ethnohistory is directly concerned with the study of indigenous or non-Western peoples from a combined historical/anthropological viewpoint, which employs written documents, oral narrative, material culture, and ethnographic data for analysis.

European exploration along the California coast began in 1542 with the landing of Juan Rodriguez Cabrillo and his men at San Diego Bay. Sixty years after the Cabrillo expeditions, an expedition under Sebastian Viscaíno made an extensive and thorough exploration of the Pacific coast. Although the voyage did not extend beyond the northern limits of the Cabrillo track, Viscaíno had the most lasting effect upon the nomenclature of the coast. Many of his place names have survived, whereas practically every one of the names created by Cabrillo have faded from use. For instance, Cabrillo named the first (now) United States port he stopped at "San Miguel"; 60 years later, Viscaíno changed it to "San Diego" (Rolle 1969). The early European voyages observed Native Americans living in villages along the coast but did not make any substantial, long-lasting impact. At the time of contact, the Luiseño population was estimated to have ranged from 4,000 to as many as 10,000 individuals (Bean and Shipek 1978; Kroeber 1976).

The historic background of the project area began with the Spanish colonization of Alta California. The first Spanish colonizing expedition reached southern California in 1769 with the intention of converting and civilizing the indigenous populations, as well as expanding the knowledge of and access to new resources in the region (Brigandi 1998). As a result, by the late eighteenth century, a large portion of southern California was overseen by Mission San Luis Rey (San Diego County), Mission San Juan Capistrano (Orange County), and Mission San Gabriel (Los Angeles County), who began colonizing the region and surrounding areas (Chapman 1921).

Native Californians may have first coalesced with Europeans around 1769 when the first Spanish mission was established in San Diego. In 1771, Friar Francisco Graces first searched the Californian desert for potential mission sites. Interactions between local tribes and Franciscan priests occurred by 1774 when Juan Bautista De Anza made an exploration of Alta California.

Serrano contact with the Europeans may have occurred as early as 1771 or 1772, but it was not until approximately 1819 that the Spanish directly influenced the culture. The Spanish established asistencias in San Bernardino, Pala, and Santa Ysabel. Between the founding of the asistencia and secularization in 1834, most of the Serranos in the San Bernardino Mountains were removed to the nearby missions (Beattie and Beattie 1951:366) while the Cahuilla maintained a high level of autonomy from Spain (Bean 1978).

Each mission gained power through the support of a large, subjugated Native American workforce. As the missions grew, livestock holdings increased and became increasingly vulnerable to theft. To protect their interests, the southern California missions began to expand inland to try and provide additional security (Beattie and Beattie 1939; Caughey 1970). In order to meet their needs, the Spaniards embarked upon a formal expedition in 1806 to find potential locations within what is now the San Bernardino Valley. As a result, by 1810, Father Francisco Dumetz of Mission San Gabriel had succeeded in establishing a religious site, or capilla, at a Cahuilla rancheria called Guachama (Beattie and Beattie 1939). San Bernardino Valley received its name from this site, which was dedicated to San Bernardino de Siena by Father Dumetz. The Guachama rancheria was located in present-day Bryn Mawr in San Bernardino County.

These early colonization efforts were followed by the establishment of estancias at Puente (circa 1816) and San Bernardino (circa 1819) near Guachama (Beattie and Beattie 1939). These efforts were soon mirrored by the Spaniards from Mission San Luis Rey, who in turn established a presence in what is now Lake Elsinore, Temecula, and Murrieta (Chapman 1921). The indigenous groups who occupied these lands were recruited by missionaries, converted, and put to work in the missions (Pourade 1961). Throughout this period, the Native American populations were decimated by introduced diseases, a drastic shift in diet resulting in poor nutrition, and social conflicts due to the introduction of an entirely new social order (Cook 1976).

Mexico achieved independence from Spain in 1822 and became a federal republic in 1824. As a result, both Baja and Alta California became classified as territories (Rolle 1969). Shortly thereafter, the Mexican Republic sought to grant large tracts of private land to its citizens to begin to encourage immigration to California and to establish its presence in the region. Part of the establishment of power and control included the desecularization of the missions circa 1832. These same missions were also located on some of the most fertile land in California and, as a result, were considered highly valuable. The resulting land grants, known as "ranchos," covered expansive portions of California and by 1846, more than 600 land grants had been issued by the Mexican government. Rancho Jurupa was the first rancho to be established and was issued to Juan Bandini in 1838. Although Bandini primarily resided in San Diego, Rancho Jurupa was located in what is now Riverside County (Pourade 1963). A review of Riverside County place names quickly illustrates that many of the ranchos in Riverside County lent their names to present-day locations, including Jurupa, El Rincon, La Sierra, El Sobrante de San Jacinto, La Laguna (Lake Elsinore), Santa Rosa, Temecula, Pauba, San Jacinto Nuevo y Potrero, and San Jacinto Viejo (Gunther 1984). As was typical of many ranchos, these were all located in the valley environments within western Riverside County.

The treatment of Native Americans grew worse during the Rancho Period. Most of the Native Americans were forced off their land or put to work on the now privately-owned ranchos, most often as slave labor. Considering the brutality of the ranchos, the degree to which Native Americans had become dependent upon the mission system is evident when, in 1838, a group of Native Americans from Mission San Luis Rey petitioned government officials in San Diego to relieve suffering at the hands of the rancheros:

> We have suffered incalculable losses, for some of which we are in part to be blamed for because many of us have abandoned the Mission … We plead and beseech you … to grant us a Rev. Father for this place. We have been accustomed to the Rev. Fathers and to their manner of managing the duties. We labored under their intelligent directions, and we were obedient to the Fathers according to the regulations, because we considered it as good for us. (Brigandi 1998:21)

Native American culture had been disrupted to the point where they could no longer rely upon prehistoric subsistence and social patterns. Not only does this illustrate how dependent the Native Americans had become upon the missionaries, but it also indicates a marked contrast in the way the Spanish treated the Native Americans as compared to the Mexican and United States ranchers. Spanish colonialism (missions) is based upon utilizing human resources while integrating them into their society. The ranchers, both Mexican and American, did not accept Native Americans into their social order and used them specifically for the extraction of labor, resources, and profit. Rather than being incorporated, they were either subjugated or exterminated (Cook 1976).

In 1846, war erupted between Mexico and the United States. In 1848, with the signing of the Treaty of Guadalupe Hidalgo, the region was annexed as a territory of the United States, and in 1850, California became a state. These events generated a steady flow of settlers into the area, including gold miners, entrepreneurs, health-seekers, speculators, politicians, adventurers, seekers of religious freedom, and individuals desiring to create utopian colonies. As the non-native population increased through immigration, the indigenous population rapidly declined from the high morbidity of European diseases, low birth rates, and conflict and violence. California became a state in 1850 and was divided into 21 counties. The dwindling native populations were eventually displaced into reservations after California became a stat

By 1846, tensions between the United States and Mexico had escalated to the point of war (Rolle 1969). In order to reach a peaceful agreement, the Treaty of Guadalupe Hidalgo was put into effect in 1848, which resulted in the annexation of California to the United States. Once California opened to the United States, waves of settlers moved in searching for gold mines, business opportunities, political opportunities, religious freedom, and adventure (Rolle 1969; Caughey 1970). By 1850, California had become a state and was eventually divided into 27 separate counties. A much larger population was now settling in California, primarily in the central

valley, San Francisco, and the Gold Rush region of the Sierra Nevada mountain range (Rolle 1969; Caughey 1970). During this time, southern California grew at a much slower pace than northern California and was still dominated by the cattle industry that was established during the earlier rancho period.

By the late 1880s and early 1890s, there was growing discontent between San Bernardino and Riverside, its neighbor 10 miles to the south, due to differences in opinion concerning religion, morality, the Civil War, politics, and fierce competition to attract settlers. After a series of instances in which charges were claimed about unfair use of tax monies to the benefit of only the city of San Bernardino, several people from Riverside decided to investigate the possibility of a new county. In May 1893, voters living within portions of San Bernardino County (to the north) and San Diego County (to the south) approved the formation of Riverside County. Early business opportunities were linked to the agriculture industry, but commerce, construction, manufacturing, transportation, and tourism also provided a healthy local economy.

A Brief History of the Project Vicinity

In the early 1860s, as gold mining in the Sierra Nevada mountains began to decline, many miners looked to the Mojave Desert. However, it was not until the discovery of silver in Calico and the construction of the Southern Pacific Railroad from Mojave to Daggett in 1882 that the region became a mining center. This gave rise to the now famous 20-mule teams. Ten teams were hitched together with two wagons and a water wagon to haul ore from Daggett to the town of Calico. The rich silver deposits gave birth to Calico Mines, Waterman Mines, and Daggett Mills (Kyle 1990). One of the most prevalent mines in the Morongo Basin region was the Desert Queen Mine, where gold was discovered in the 1890s. The mine remained in operation until 1961 (Chappell 1971). Although many miners hoped to find gold or silver, these ventures also bolstered the non-metallic mining industry, which remains a significant portion of the Morongo Basin and greater Mojave Desert commercial industry (Fife 1988).

Transportation has also been instrumental in the development of the Morongo Basin. In the 1930s, State Route (SR) 62, also known as the Twentynine Palms Highway) replaced the Banning-Dale Road as the preferred route through the Morongo Basin. The Banning-Dale Road had emerged in the 1910s, but the general alignment had been utilized since the 1840s or 1850s as a wagon trail reportedly established by Powell "Paulino" Weaver (Grubbs 2007).

In 1936 Joshua Tree National Monument was established, which also increased travel and the popularity of the Morongo Basin region (NPS 2019). Not long after, in 1937, the Joshua Tree Townsite Company built offices along Twentynine Palms Road (Smith 1996). An article published on the z107.7fm radio station website states that:

> From 1941-1944, the population grew from 49 to 227 people. The first business block of 5 stores was built in 1945 and the first Post Office was built in 1946. In 1949, the area shared filming sites with nearby Pioneer Town and boasted a thriving

> turkey industry; and in 1950, villagers celebrated the completion of their self-built fire station. In 1963, the Hi-Desert Memorial Hospital District was established, and the then Joshua Tree Fire Protection District expanded. The population climbed to 3,800 people by 1967 and up to 4,500 people by 1969. By the 1970s, the area began to see more extensive development, including a Modern hospital on White Feather Road and the completion of the Joshua Tree Community Center in 1979. (Smith 1996)

As part of the Desert Protection Bill, Joshua Tree National Monument was elevated to park status on October 31, 1994, and 234,000 acres were added to the new park's boundaries (NPS 2019).

1.4 Results of the Archaeological Records Search

BFSA requested an archaeological records search for a one-mile radius around the project from the SCCIC at CSU Fullerton. The SCCIC records search identified seven cultural resources within one mile of the project, none of which are located within the subject property. The resources identified during the records search include three prehistoric isolates, one multicomponent site, one historic trash scatter, and two historic isolates (Table 1.4–1).

Table 1.4–1
Cultural Resources Within One Mile of the Project

Site Number	Resource Type
P-36-025046, P-36-025048, and P-36-026907	Prehistoric isolate
P-36-028351	Multicomponent site containing two prehistoric lithic scatters, a prehistoric isolate, the historic Roy Williams Airport/Hi-Desert Airport, two historic trash scatters, and one historic isolate
P-36-025036	Historic trash scatter
P-36-025047 and P-36-025049	Historic isolate

The records search results also identified six cultural resource studies that have been conducted within one mile of the project, none of which include any portion of the project. The complete records search results can be found in Appendix C.

In addition, BFSA reviewed the following historic sources:

- The National Register of Historic Places Index
- The Office of Historic Preservation, Archaeological Determinations of Eligibility
- The Office of Historic Preservation, Built Environment Resources Directory
- Bureau of Land Management (BLM) General Land Office (GLO) records

- Historic USGS maps
- Historic aerial photographs (1953, 1970, 1983, 1989, 1995, 2005, 2009, 2010, 2012, 2014, 2016, 2018, 2021)

The BLM GLO records show a 1930 patent was issued to Laura Burns for the property and surrounding area comprising the entirety of the northeast quarter of Section 20, Township 1 North, Ranch 7 East. San Bernardino County Assessor's data on file with the Property Information Management System show the project parcel was acquired by Kennith and Neva Claypool in 1965. According to the aerial photographs, one structure is visible in the northeast quarter of the property by 1953, approximately 50 feet south of East Broadway. This structure is also visible on the 1955 USGS 15' *Joshua Tree* quadrangle map. By 1970, an additional structure, possibly a shed, is also visible at this location. Although the images are blurry, it does appear that the structures are still present on the 1983 and 1989 photographs. By 1995 the structures are no longer visible. Subsequent photographs show the project as a vacant desert landscape.

BFSA also requested a SLF search from the NAHC. The results were negative for the presence of any recorded Native American sacred sites or locations of religious or ceremonial importance within one mile of the project. All correspondence is provided in Appendix D.

1.5 Applicable Regulations

Resource importance is assigned to districts, sites, buildings, structures, and objects that possess exceptional value or quality illustrating or interpreting the heritage of San Bernardino County in history, architecture, archaeology, engineering, and culture. Several criteria are used in demonstrating resource importance. Specifically, the criteria outlined in CEQA, provide the guidance for making such a determination. The following sections detail the criteria that a resource must meet in order to be determined important.

1.5.1 California Environmental Quality Act

According to CEQA (§15064.5a), the term "historical resource" includes the following:

1) A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in the CRHR (Public Resources Code SS5024.1, Title 14 CCR. Section 4850 et seq.).
2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3) Any object, building, structure, site, area, place, record, or manuscript, which a lead agency determines to be historically significant or significant in the architectural,

engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (Public Resources Code SS5024.1, Title 14, Section 4852) including the following:

a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
b) Is associated with the lives of persons important in our past;
c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
d) Has yielded, or may be likely to yield, information important in prehistory or history.

4) The fact that a resource is not listed in, or determined eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1[k] of the Public Resources Code), or identified in a historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be a historical resource as defined in Public Resources Code Section 5020.1(j) or 5024.1.

According to CEQA (§15064.5b), a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. CEQA defines a substantial adverse change as:

1) Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired.
2) The significance of a historical resource is materially impaired when a project:

a) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in the CRHR; or
b) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of

Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or,

c) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA.

Section 15064.5(c) of CEQA applies to effects on archaeological sites and contains the following additional provisions regarding archaeological sites:

1) When a project will impact an archaeological site, a lead agency shall first determine whether the site is a historical resource, as defined in subsection (a).
2) If a lead agency determines that the archaeological site is a historical resource, it shall refer to the provisions of Section 21084.1 of the Public Resources Code, Section 15126.4 of the guidelines, and the limits contained in Section 21083.2 of the Public Resources Code do not apply.
3) If an archaeological site does not meet the criteria defined in subsection (a), but does meet the definition of a unique archaeological resource in Section 21083.2 of the Public Resources Code, the site shall be treated in accordance with the provisions of Section 21083.2. The time and cost limitations described in Public Resources Code Section 21083.2 (c-f) do not apply to surveys and site evaluation activities intended to determine whether the project location contains unique archaeological resources.
4) If an archaeological resource is neither a unique archaeological nor historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or Environmental Impact Report, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process.

Section 15064.5(d) and (e) contain additional provisions regarding human remains. Regarding Native American human remains, paragraph (d) states:

(d) When an Initial Study identifies the existence of, or the probable likelihood of, Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the NAHC as provided in Public Resources Code SS5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains, and any items associated with Native American burials with the appropriate Native Americans as identified by

the NAHC. Action implementing such an agreement is exempt from:

1) The general prohibition on disinterring, disturbing, or removing human remains from any location other than a dedicated cemetery (Health and Safety Code Section 7050.5).
2) The requirements of CEQA and the Coastal Act.

2.0 RESEARCH DESIGN

The primary goal of the research design is to attempt to understand the way in which humans have used the land and resources within the project area through time, as well as to aid in the determination of resource significance. For the current project, the study area under investigation is southwestern San Bernardino County. The scope of work included the survey of the 82.1-acre study area and CEQA significance evaluations of any archaeological resources identified on the project that would be affected as a result of the development. Given the area involved and the recorded presence of archaeological sites, the research design for this project was focused upon realistic study options. Since the main objective of the investigation was to identify the presence of and potential impacts to cultural resources, the goal is not necessarily to answer wide-reaching theories regarding the development of early southern California, but to investigate the role and importance of the identified resources. Nevertheless, the assessment of the significance of a resource must take into consideration a variety of characteristics, as well as the ability of the resource to address regional research topics and issues.

Although elementary site testing programs are limited in terms of the amount of information available, several specific research questions were developed that could be used to guide the initial investigations of any observed cultural resources. The following research questions take into account the size and location of the project discussed above.

Research Questions:

- Can located cultural resources be situated with a specific time period, population, or individual?
- Do the types of located cultural resources allow a site activity/function to be determined from a preliminary investigation? What are the site activities? What is the site function? What resources were exploited?
- How do the located sites compare to others reported from different surveys conducted in the area?
- How do the located sites fit existing models of settlement and subsistence for valley and inland foothill environments of the region?

Data Needs

At the test level, the principal research objective is a generalized investigation of changing settlement patterns in both the prehistoric and historic periods within the study area. The overall goal is to understand settlement and resource procurement patterns of the project area occupants. Therefore, adequate information on site function, context, and chronology from an archaeological perspective is essential for the investigation. The fieldwork and archival research were undertaken with the following primary research goals in mind:

1) To identify cultural resources occurring within the project;
2) To determine, if possible, site type and function, context of the deposit, and chronological placement of each cultural resource identified;
3) To place each cultural resource identified within a regional perspective; and
4) To provide recommendations for the treatment of each of the cultural resources identified.

3.0 ANALYSIS OF PROJECT EFFECTS

The cultural resources assessment of the project consisted of an institutional records search, archival research, an intensive cultural resource survey of the entire 81.2-acre study area, and the preparation of this technical report. This study was conducted in conformance with Section 21083.2 of the California Public Resources Code and CEQA. Statutory requirements of CEQA (Section 15064.5) were followed for the identification and evaluation of resources. Specific definitions for archaeological resource type(s) used in this report are those established by the State Historic Preservation Office (SHPO 1995).

3.1 Methods

3.1.1 Field Methodology

The survey was conducted by Consulting Archaeologist Brian F. Smith on March 26, 2023, with assistance from Kathyrn Smith. Methodology employed during the current investigation followed standard archaeological field procedures and was sufficient to accomplish a thorough survey of the project. The field methodology employed for the project included walking evenly spaced survey transects set approximately 10 to 15 meters apart while visually inspecting the ground surface. The archaeological survey was an intensive reconnaissance consisting of a series of survey transects across the project, the entirety of which was accessible. All potentially sensitive areas where cultural resources might be located were closely inspected. Photographs documenting survey areas and overall survey conditions were taken frequently. During the survey, two historic trash scatters and a historic cistern identified as Sites Temp-1 and Temp-2 were located within the project. Based upon the results of the survey program, both sites were subjected to an archaeological test program and evaluated under CEQA criteria during a subsequent visit to the property.

3.1.2 Test Methods

Under the direction of Principal Investigator Tracy A. Stropes, M.A., RPA, the testing program and evaluation of Sites Temp-1 and Temp-2 within the project were implemented on May 3, 2023. The testing program was conducted by field archaeologists David Grabski and Sabrina Corcoran. Sites Temp-1 and Temp-2 were subjected to subsurface tests and were recorded using Trimble Nomad Global Positioning System (GPS) instruments. The testing program was accomplished using STPs that measured 25 centimeters in diameter and between 30 and 50 centimeters in depth. The STPs were excavated in 10-centimeter contour levels (parallel to the original ground surface). All excavated sediments were passed through one-eighth-inch mesh hardwire screens. No significant subsurface deposits were identified at either site. The locations of all tests were mapped via GPS. All field data was recorded on appropriate forms, and photographs were used to document the excavations.

3.1.3 Laboratory and Cataloging Procedures

In keeping with generally accepted archaeological procedures and utilizing a classification system commonly employed in this region, collected artifacts would be categorized according to artifact class, material class, and technological class. Comparative collections at the BFSA laboratory are employed in identifying unusual or highly fragmentary specimens as necessary. After cataloging and identification, the collections are marked with the appropriate provenience and catalog information. Considering the artifact assemblage is redundent and that recovery from the test excavations did not identifiy any significant archaeological deposits or artifacts, no material will be curated.

Historic Artifact Sorting and Analysis

The sorting technique for historic artifact collections includes the sorting, identification, and cataloging of all materials returned to the BFSA laboratory. Bulk items such as small fragments of ceramic and nondescript glass and metal are weighed and cataloged en masse, by material type, for each level. All remaining artifacts are separated by class and type and bagged accordingly. All artifacts are identified and entered into a database to produce an artifact catalog.

Historic Artifact Functional Categories

Artifacts are prepared for cataloging according to standard laboratory practices. Items that are covered in dirt to the point of obscuring relevant characteristics are dry-brushed or wiped with a damp cloth in order to enhance the artifact description. Each catalog entry is bagged in a two-millimeter-thick archival-quality bag labeled with location and catalog number information. The information recorded about cataloged artifacts includes provenience and depth, material, quantity and/or weight, artifact type, functional category, and a brief description of the artifact(s), which includes any diagnostic information about manufacturing methods, brand or product marks, and manufacturers' marks. Artifacts sharing the same provenience, material, and color characteristics but that were fragmentary are assigned a single catalog number. Artifacts are classified by functional category for purposes of analysis. These functional categories have been outlined by Van Wormer et al. (2005) and include:

- *Consumer Items* – Consumer items consist of packaged items purchased and consumed on a regular basis. Generally, these include groceries such as condiments, other preserved foods, and beverages. Under most conditions, consumer items recovered from archaeological deposits came in containers that do not deteriorate over time, such as glass or ceramic bottles and jars, and in some instances, tin cans.

- *Kitchen Items* – Kitchen items are defined as objects used in tasks of food preparation, serving, and consumption. These types of artifacts may include ceramic kitchen and tableware, glass tableware, canning jars, canning jar lids and related items, dairy bottles, cooking utensils, and flatware.

- *Food Items* – Food items include butchered bone, fish bone, shellfish, and seeds.

- *Household Items* – Household items are mainly related to a house structure and its furnishings, as well as non-food-related items used by the inhabitants. Artifact classes and types considered part of this category include lamps, medicines, cleaning products, household ceramics and glassware, household plant pots, and batteries.

- *Garment Items* – Garment items include all items related to clothing, including objects such as buckles, buttons, beads, shoe parts, and fabric fragments.

- *Personal Items* – Personal items are associated with an individual rather than a household and are therefore not generally shared. Artifact classes and types in this category include grooming and hygiene products, some medicines, cosmetic/beauty products, clothing items, personal adornment items such as jewelry, eyeglasses, and hair adornment, keys, pocket tools, purses, smoking-related items, and portable musical instruments.

- *Toys and Games* – Toys and games are items that include doll parts, marbles, toy jacks and jars, and candy containers.

- *Currency Items* – Currency items include coins and tokens.

- *Livery Items* – Livery items are primarily concerned with the use and maintenance of horses and horse-drawn vehicles. This may include a range of items from common horseshoes to saddle and buggy parts.

- *Transportation Items* – Transportation items are related to the use of automobiles and bicycles instead of horses and horse-drawn vehicles. This may include bicycles, tricycles, and automobile hitches.

- *Munitions Items* – Munitions items are related to the use, maintenance, and repair of firearms. This may include a range of items from the firearm itself, spent cartridges, gunflints, musket balls, and fragmented parts.

- *Hardware Items* – Hardware items are manufactured items used in the construction or maintenance of a residence that include screws, bolts, washers, brackets, hinges, handles, wire fragments, and plumbing.

- *Building Materials* – Building materials include all items related to the construction and maintenance of buildings and structures. This includes items such as door and lock parts, nails, window glass, brick fragments, milled wood fragments, electrical hardware, etc.

- *Machinery Items* – Machinery items include all machine parts that are not directly related to agricultural activities.

- *Tools* – Tools generally include any hand tool used to build or maintain a structure or operate a business. Axes, shovels, chisels, and pencils are all common tools.

- *Unidentifiable Items* – Unidentifiable items are too small or fragmentary to identify to artifact type.

3.2 Results of the Field Survey

Consulting Archaeologist Brian F. Smith conducted the archaeological survey for the project on March 26, 2023, with assistance from Kathyrn Smith. The vegetation across the landscape consisted primarily of creosote bushes, wildflowers, and sage (Plates 3.2–1 and 3.2–2). Ground visibility during the survey was considered moderate to good. However, accumulated wind-swept soil hindered ground visibility around the bases of creosote bushes. No prehistoric resources were identified during the survey; however, the survey did result in the identification of sporadic wind-blown isolated cans and metal fragments throughout the property as well as two historic archaeological sites (see Plate 3.2–1 through Plate 3.2–4). The two archaeological sites were labeled Site Temp-1 and Site Temp-2 at the time of the survey and have been recorded on the applicable 523 Series DPR forms (see Appendix B). Site Temp-1 is centered on the structural remains of a cistern in the general location where the historic photographs show structures between 1953 and 1989, while Site Temp-2 is a trash scatter located northwest of the intersection of 3rd Street and Sunever Road (Figures 3.2–1 and 3.2–2).

Plate 3.2–1: Overview of the property, facing east.

Plate 3.2–2: Overview of the project, facing west.

Plate 3.2–3: Overview of Site Temp-1, facing northeast.

Plate 3.2–4: Overview of Site Temp-2, facing north.

Figure 3.2–1
Cultural Resource Location Map

(Deleted for Public Review; Bound Separately)

Figure 3.2–2
Cultural Resource Locations
Shown on an Aerial Photograph

(Deleted for Public Review; Bound Separately)

3.3 Results of Significance Testing

3.3.1 Site Temp-1

Site Temp-1 was identified in the northeastern portion of the project just south of East Broadway and approximately 850 feet west of Sunever Road, in the location where structures are visible on aerial photographs from 1953 through 1989. A concrete-capped and concrete-walled buried cistern was identified at this location. The cistern measures approximately five square feet, with a rectangular opening in the northwest corner of the concrete cap (Plates 3.3–1 and 3.3–2). Water was visible approximately four feet below the cap, but the depth of the cistern could not be determined. Also noted just south of the cistern were three small cement post foundations. Spreading out from the cistern is a concentration of historic trash and building materials. The site measures 200 feet north-to-south by 220 feet east-to-west (see Figure 3.3–1).

Plate 3.3–1: Overview of Site Temp-1, facing east.

Plate 3.3–2: Overview of the cistern at Site Temp-1, facing east.

Surface Recordation

Prior to the initiation of subsurface excavations, the surface expression of the site was mapped and recorded in detail using GPS equipment with sub-meter capability (Figure 3.3–1). In addition to the cistern, scattered disarticulated lumber was also noted, some of was burned, and others appear to be buried and possibly part of a structural support for a residence. Within the concentration of scattered trash, domestic discards such as plateware (coffee cups, plates), bottle glass, metal containers, window glass, shotgun cartridges, and nails were noted (Plates 3.3–3 and 3.3–4). A representative sample of the artifact assemblage was collected from nine locations across the site consisting of one fragment of window glass, one glass vessel, nine glass bottles, one glass jar, three metal bottle closure/caps, three metal jar closures/clamps, six metal sanitary cans, 10 metal hardware/building materials, three metal bullet casings, nine metal nails, six metal screws, eight pieces of ceramic tableware, and two pieces of ceramic hotelware (Table 3.3–1).

Plate 3.3–3: Overview of Site Temp-1, facing west.

Plate 3.3–4: Close-up view of the historic artifacts at Site Temp-1.

Figure 3.3–1
Excavation Location Map
Site Temp-1

(Deleted for Public Review; Bound Separately)

Table 3.3–1
Surface Collection Data for Site Temp-1

Surface Collection	Object Type	Material Type	Quantity	Cat No.
1	Nail	Metal	1	33
			1	34
			1	35
			1	36
	Hinge		1	37
	Bottle		1	38
	Tableware	Ceramic	1	39
			1	40
2	Window Glass	Glass	1	41
	Bottle		1	42
			1	43
	Jar	Metal	1	44
	Hardware		1	45
	Munitions		1	46
			1	47
	Can		1	48
			1	49
	Tableware	Ceramic	1	50
			1	51
			1	52
3	Nail	Metal	3	53
			2	56
	Screw		2	54
			1	55
			1	57
			1	58
			1	59
	Hardware		1	60
			2	61
			1	62
			1	63
			2	65
	Hinge		1	64
4	Can	Metal	1	66
	Bottle	Glass	1	67
			1	68

Surface Collection	Object Type	Material Type	Quantity	Cat No.
			1	69
			1	70
5	Jar	Metal	1	71
			1	72
		Glass	1	78
	Bottle	Metal	1	73
			1	74
		Glass	1	75
			1	76
	Vessel	Glass	1	77
6	Can	Metal	1	79
	Tableware	Ceramic	1	80
	Hotelware		1	81
7	Can	Metal	1	82
			1	83
8	Vessel	Ceramic	1	84
	Tableware		1	85
	Munitions	Metal	1	86
	Bottle	Glass	1	87
9	Hotelware	Ceramic	1	88
Total	-	-	62	-

Subsurface Excavations

In order to determine if any significant archaeological deposits exist at Site Temp-1, four STPs were excavated to depths between 30 and 50 centimeters within the concentration of the artifact scatter (see Figure 3.3–1). The native soil across the site includes a loosely compacted light brown and tan (2.5Y 6/4) sandy silt, which became more compacted the deeper the STP was excavated (Table 3.3–2). Ninety-two artifacts, mostly fragmented in nature, were recovered from the upper levels of the STPs (0 to 20 centimeters) (see Table 3.3–2). This material consists of four glass bottle fragments, two glass container fragments, nine glass vessel fragments, one glass druggist bottle, 55 fragments of window glass, one metal pull tab beer can, four metal food cans, four metal bullet casings, nine metal nails, two metal screws, and one metal wire fragment. Most of this material (N=82; 90.10 percent) was recovered from the first level (0 to10 centimeters). Given the fragmented nature of the recovery coupled with the removal of stuctrures in this vicinity, the material recovered in the upper levels of the STPs does not represent an intact deposit. Rather this limited material is a reflection of the impacts to the site as a result of disturbances associated with the demolition and removal of the structures from the property.

Table 3.3–2
Shovel Test Excavation Data for Site Temp-1

Unit No.	Depth (cm)	Soils Encountered	Object Type	Material Type	Cat No.	Quantity
1	0-10	Loosely compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules	Nail	Metal	2	1
			Window Glass	Glass	1	3
	10-20		Nail	Metal	4	1
					5	1
			Window Glass	Glass	3	1
	20-30	Moderately compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules	No Recovery			
	30-40					
	40-50					
2	0-10	Loosely compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules	Bottle	Glass	8	1
			Window Glass		7	1
					6	1
			Nail	Metal	9	1
	10-20		No Recovery			
	20-30	Moderately compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules				
3	0-10	Loosely compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules	Bottle	Glass	12	1
					14	1
					15	1
			Vessel		11	9
			Vial		16	1
			Window Glass		10	45
			Container		13	1
			Can	Metal	17	1

Unit No.	Depth (cm)	Soils Encountered	Object Type	Material Type	Cat No.	Quantity
					21	4
			Munitions		23	3
			Nail		18	1
					19	1
			Wire		20	1
	10-20		Container	Glass	25	1
			Window Glass		24	2
			Munitions	Metal	28	1
			Nail		26	1
					27	1
	20-30	Moderately compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules	No Recovery			
	30-40					
	40-50					
4	0-10	Loosely compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules	Nail	Metal	31	1
			Screw		29	1
					30	1
			Window Glass	Glass	32	2
	10-20		No Recovery			
	20-30	Moderately compacted light brown and tan (2.5Y 6/4) sandy silt with subangular granules				
Total	-	-	-			92

Discussion

Site Temp-1 consists of a small, sparse scatter of historic artifacts surrounding the remnant cistern associated with structures visible on aerial photographs from 1953 through 1989. Of the 153 artifacts recovered from the surface collection and subsurface excavations (STP) the assemblage is predominantly glass (N=83; 54.20 percent), followed by metal (N=60; 39.20 percent) and ceramic (N=10; 6.50 percent) (Table 3.3–3).

Table 3.3–3
Cultural Materials Recovered from Site Temp-1

Cultural Material	Depth (cm)			Total	Percent
	Surface	0-10	10-20		
Ceramic	10	-		10	6.50
Glass	12	67	4	83	54.20
Metal	40	15	5	60	39.20
Total	62	82	9	153	-
Percent*	40.50	53.60	5.90	-	100.00*

**Rounded totals may not equal 100 percent*

When placed into functional categories the material recovered from Site Temp-1 is predominantly comprised of building materials (N=83; 54.20 percent), followed by consumer items (N=41; 26.8 percent); kitchen items (N=10; 6.50 percent); hardware items (N=7; 4.60 percent); munitions (N=7; 4.60 percent); furniture items (N=2; 1.30 percent); household items (N=2; 1.3 percent); and personal items (N=1; 0.7 percent).

Table 3.3–4
Functional Categories Represented by
Cultural Materials Recovered from Site Temp-1

Functional Category	Depth (cm)			Total	Percent
	Surface	0-10	10-20		
Building Material	19	59	5	83	54.20
Consumer Items	21	19	1	41	26.80
Furniture Items	-	-	2	2	1.30
Hardware Items	7	-	-	7	4.60
Household Items	1	1	-	2	1.30
Kitchen Items	10	-	-	10	6.50
Munitions	3	3	1	7	4.60
Personal Items	1	-	-	1	0.70
Total	62	82	9	153	-
Percent	40.50	53.60	5.90	-	100.00*

**Rounded totals may not equal 100 percent*

In order to more accurately date the surface artifacts recovered from Temp-1, only those items representing expendable consumer products were used in assigning a date range. Consumer

expendables are useful for dating an assemblage because they represent items that are only used for a brief period and are then discarded. Although some recycling behaviors did occur historically, when several items are taken together as a group, a greater level of confidence can be achieved when examining date ranges and periods of occupation. Upon review of the temporally diagnostic artifacts (Table 3.3–5), it was determined that the material primarily represents discarded bottles from the late 1960s and 1970s; however, one bottle with an earlier manufacture date of 1925 to1939 was identified. Regardless, the recovered material is generally consistent with the date range that structures are visible within this location. Given that the majority of the recovery from the site consists of building materials coupled with the results of the temporally diagnostic artifacts, it can be concluded that the site was created at the time the structures within the property were demolished.

Table 3.3–5

Temporally Diagnostic Consumer Items Recovered from Site Temp-1

Date Range	Object Type	Manufacturer / Company	Cat. No.(s)
1965-1969	Beverage Can	Indeterminate	17
1905-2023	Beverage Bottle	Indeterminate	42
1978-1978	Beverage Bottle	Owens-Illinois Glass Co.	43
1925-1939	Indeterminate Bottle	Latchford-Marble Glass Company	69
1976	Indeterminate Bottle	Owens-Illinois Glass Co.	70
1978	Indeterminate Bottle	Owens-Illinois Glass Co.	87

Site Summary

Site Temp-1 measures 200 feet north-to-south by 220 feet east-to-west. An analysis of the Site Temp-1 assemblage indicates that the resource was likely created when the structures located there were demolished. Subsurface investigations did not reveal any significant intact deposits of historic artifacts. As such, the testing of Temp-1 and recordation of the cistern and associated artifact concentration has exhausted the site's research potential. Therefore, due to a lack of unique elements at Site Temp-1, the site is evaluated as not eligible for listing on the CRHR, according to the criteria listed in CEQA, Section 15064.5. The level of information already obtained from this site, including documentation of boundaries, collection of a sample of the artifacts present, and dating analysis of the recovered artifacts, has exhausted the research potential of the site. No further archaeological investigations are recommended for Site Temp-1.

3.3.2 Site Temp-2

Site Temp-2 was identified in the southeastern corner of the property just northwest of the intersection of 3rd Street and Sunever Road (Plate 3.3–5). The site contains a historic artifact scatter comprised of historic cans, metal fragments, and glass fragments. Modern trash was also noted at the site. The site measures 175 feet north-to-south by 50 feet east-to-west (See Figure 3.3–2).

Plate 3.3–5: Overview of Site Temp-2, facing northeast.

Surface Recordation

Prior to the initiation of subsurface excavations, the surface expression of the site was mapped and recorded in detail using GPS equipment with sub-meter capability (Figure 3.3–2). A representative sample of the artifact assemblage was collected from five locations across the site consisting of one glass bottle, six metal cans, one canning jar lid, and one terracotta planter fragment (Table 3.3–6).

Subsurface Excavations

In order to determine if any significant archaeological deposits exist at Site Temp-2, two STPs were excavated to depths between 30 and 50 centimeters within the concentration of the artifact scatter (see Figure 3.3–2). The native soil across the site includes a loosely compacted light brown and tan (2.5Y 6/4) sandy silt, which became more compacted the deeper the STP was excavated (Table 3.3–7). One fragment of mirror glass was recovered from the upper level (0 to10 centimeters) of STP 1; however, no intact archaeological deposits were encountered.

Figure 3.3–2
Excavation Location Map
Site Temp-2

(Deleted for Public Review; Bound Separately)

Table 3.3–6
Surface Collection Data for Site Temp-2

Surface Collection	Object Type	Material Type	Quantity	Cat No.
1	Can	Non-ferrous metal	1	1
2			1	3
	Jar lid		1	2
3	Bottle	Amber glass	1	6
	Can	Non-ferous metal	1	4
			1	5
	Planter	Terracota	1	7
4	Can	Non-ferrous metal	1	8
5			1	9
Total	-	-	9	-

Table 3.3–7
Shovel Test Excavation Data for Site Temp-2

Shovel Test Pit	Depth (cm)	Soils Encountered	Object Type	Material Type	Quantity	Cat No
1	0-10	Loosely compacted light brown and tan (2.5 Y 6/4) silty sand	Mirror	Glass	1	10
	10-20	Moderately compacted light brown and tan (2.5 Y 6/4) silty sand	No Recovery			
	20-30					
2	0-10	Loosely compacted light brown and tan (2.5 Y 6/4) silty sand				
	10-20	Moderately compacted light brown and tan (2.5 Y 6/4) silty sand				
	20-30					
Total	-	-	-	-	1	-

Discussion

Site Temp-2 consists of a small, sparse scatter of historic artifacts northwest of the intersection of 3rd Street and Sunever Road. Of the 10 artifacts recovered from the surface collection and subsurface excavations, the assemblage is predominantly metal (N=7; 70.00 percent), followed by glass (N=2; 20.00 percent) and ceramic (N=1; 10.00 percent) (Table 3.3–8). When placed into functional categories, the material recovered from site Temp-2 is predominantly comprised of consumer items (N=7; 70.00 percent), followed by gardening, kitchen, and personal items, each respectively representing 10.00 percent of the assemblage (Table 3.3–9).

Table 3.3–8
Cultural Materials Recovered from Site Temp-2

Material Type	Depth (cm)		Total	Percent
	Surface	0-10		
Ceramic	1	-	1	10.00
Glass	1	1	2	20.00
Metal	7	-	7	70.00
Total	9	1	10	-
Percent	90.00	10.00	-	100.00

Table 3.3–9
Functional Categories Represented by
Cultural Materials Recovered from Site Temp-2

Functional Categories	Depth (cm)		Total	Percent
	Surface	0-10		
Consumer Items	7	-	7	70.00
Gardening Items	1		1	30.00
Kitchen Items	1		1	
Personal Items	-	1	1	
Total	9	1	10	-
Percent	90.00	10.00	-	100.00

In order to more accurately date the surface artifacts recovered from Temp-2, only those items representing expendable consumer products were used in assigning a date range. Consumer expendables are useful for dating an assemblage because they represent items that are only used for a brief period and are then discarded. Although some recycling behaviors did occur

historically, when several items are taken together as a group, a greater level of confidence can be achieved when examining date ranges and period of occupation. Only three of the seven consumer items could be associated with a manufacture date range. Although limited, upon review of the temporally diagnostic artifacts (Table 3.3–10), it was determined that the material primarily represents discarded cans and bottles from the late 1950s through the late 1960s. Although more modern refuse was also noted throughout the site area, historically, Site Temp-2 is a transient refuse disposal site representing a single dumping episode.

Table 3.3–10

Temporally Diagnostic Consumer Items Recovered from Site Temp-2

Date Range	Object Type	Manufacturer / Company	Cat. No.(s)
1905-1959	Glass Bottle	Indeterminate	3
1962-1966	Metal food can	Indeterminate	1
1967	Metal sanitary can	Indeterminate	5

Site Summary

Site Temp-2 measures 175 feet north-to-south by 50 feet east-to-west. An analysis of the Site Temp-2 assemblage indicates that the site is entirely comprised of consumer items, likely representing a single dumping episode that occurred between the late 1950s and the late 1960s. Based upon the surface data and the lack of subsurface materials, the site does not represent the level of focused historic activity that would correspond to a historic occupation site or multi-episodic refuse deposit. Instead, the site is classified as a transient single-episode refuse disposal site with no subsurface component and limited integrity. As a result of the current collection efforts and site analysis, the site exhibits no research potential. Therefore, due to a lack of unique elements at Site Temp-2, according to the criteria listed in CEQA, Section 15064.5, the site is evaluated as not eligible for listing on the CRHR. The level of information already obtained from this site, including documentation of boundaries, collection of a sample of the artifacts present, and dating analysis of the recovered artifacts, has exhausted the research potential of the site. No further archaeological investigations are recommended for Site Temp-2.

4.0 RECOMMENDATIONS

The cultural resources assessment for the Joshua Tree Estates Project resulted in the identification of two previously undocumented historic archaeological sites (Temp-1 and Temp-2). Site Temp-1 consists of the remains of a cistern associated with structures visible on the property between 1953 and 1989, as well as refuse dating between the late 1960s and 1970s. Site Temp-2 contains refuse dating between the late 1960s and late 1970s. Based upon the current project design, the proposed development will impact these sites (Figure 4.0–1). An archaeological testing program was completed by BFSA in order to evaluate the identified archaeological sites and assess the potential impacts of the project development upon the resources.

As a result of the current study, all archaeological sites within the property are evaluated as not significant and ineligible for listing on the CRHR. Therefore, site-specific mitigation measures will not be required. However, based upon contraints resulting from partially limited ground visibility and the previosuly identified prehistoric and historic resources within the project vicinity, future grading within this property may impact cultural resources that have not been previously identified. Because the potential exists that inadvertent discoveries could be made during grading or earthwork, it is recommended that the project be conditioned with archaeological monitoring during ground disturbing activities tied to the future residential development of the property. However, during grading, the consulting archaeologist shall have the authority to modify and reduce the monitoring program to either periodic spot-checks or suspension of the monitoring program if the potential for cultural resources appears to be less than anticipated. Should human remains be discovered, treatment of these remains shall follow California Public Resources Code 5097.9. Any human remains that are determined to be Native American shall be reported to the San Bernardino County Coroner and subsequently to the NAHC.

Figure 4.0–1
Cultural Resources Shown on the
Joshua Tree Estates Subdivision Map

(Deleted for Public Review; Bound Separately)

5.0 LIST OF PREPARERS AND ORGANIZATIONS CONTACTED

The archaeological survey program for the Joshua Tree Estates Project was directed by Principal Investigator Tracy A. Stropes. The archaeological fieldwork was conducted by Consulting Archaeologist Brian F. Smith with assistance from Kathyrn Smith. The report text was prepared by Andrew J. Garrison. Report graphics were provided by Emily T. Soong. Technical editing and report production were conducted by Jacob Tidwell. The archaeological records search was conducted at the SCCIC at CSU Fullerton.

6.0 REFERENCES CITED

Bean, Lowell John
1978 Cahuilla. In *California*, edited by R.F. Heizer, pp. 575–587. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John and Charles R. Smith
1978 Serrano. In *California,* edited by R.F. Heizer, pp. 570–574. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Bean, Lowell John and Florence C. Shipek
1978 Luiseño. In *California*, edited by Robert F. Heizer, pp. 550–563. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Beattie, George W. and Helen P. Beattie
1951 *Heritage of the Valley: San Bernardino's First Century*. Biobooks, Oakland, California.

Benedict, Ruth Fulton
1924 A Brief Sketch of Serrano Culture. *American Anthropologist* 26(3).

Brigandi, Phil
1998 *Temecula: At the Crossroads of History*. Heritage Media Corporation, Encinitas, California.

Caughey, John W.
1970 *California: A Remarkable State's Life History.* 3rd ed. Prentice-Hall, Englewood Cliffs, New Jersey.

Chapman, Charles E.
1921 *A History of California: The Spanish Period*. The Macmillan Company, New York.

Chappell, Gordon
1971 National Register of Historic Places Inventory Nomination Form for the Desert Queen Mine, Joshua Tree National Monument, California. Online document. https://npgallery.nps.gov/NRHP/GetAsset/NRHP/76000216_text. Accessed May 2023.

Cook, Sherburne F.
1976 *The Conflict Between the California Indian and White Civilization*. University of California Press, Berkeley and Los Angeles, California.

Davis, Emma Lou
1978 *The Ancient Californians: Rancholabrean Hunters of the Mohave Lakes Country*. Natural History Museum of Los Angeles County, Science Series No. 29.

Dibblee, T.W., Jr.
2008 Geologic Map of Joshua Tree and Twentynine Palms 15-minute Quadrangles, San Bernardino and Riverside Counties, California. Dibblee Geology Center Map #DF-390, Minch, J.A., ed. Santa Barbara Museum of Natural History.

Drucker, Philip
1937 Culture Element Distributions: V. Southern California. *Anthropological Records* 1(1):1–52. University of California, Berkeley.

Erlandson, John M. and Roger H. Colten (editors)
1991 An Archaeological Context for Archaeological Sites on the California Coast. In *Hunter-Gatherers of Early Holocene Coastal California*, edited by J.M. Erlandson and R.H. Colten. Perspectives in California Archaeology, Volume 1, Institute of Archaeology, University of California, Los Angeles.

Fagan, Brian M.
1991 *Ancient North America: The Archaeology of a Continent*. Thames and Hudson, London.

Fife, Don
1988 *Mineral Wealth of Lucerne Valley.* California Geology, August:171-177.

Gallegos, Dennis
1985 Batiquitos Lagoon Revisited. In *Cultural Resource Management Casual Papers* 2(1). Department of Anthropology, San Diego State University.

2002 Southern California in Transition: Late Holocene Occupation of Southern San Diego County. In *Catalysts to Complexity: Late Holocene Societies of the California Coast*, edited by Jon M. Erlandson and Terry Jones. Cotsen Institute of Archaeology, University of California, Los Angeles.

Gunther, Jane Davies
1984 *Riverside County, California, Place Names: Their Origins and Their Stories.* Rubidoux Printing, Riverside, California.

Grubbs, Bruce
2007 Explore! Joshua Tree National Park: A Guide to Exploring the Desert Trails and Roads. Morris Book Publishing LLC.

Heizer, Robert F.
1978 Trade and Trails. In *California*, edited by Robert F. Heizer, pp. 690–693. Handbook of North American Indians, Vol. 8. William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Kroeber, Alfred L.
1976 *Handbook of the Indians of California*. Reprinted. Dover Editions, Dover Publications, Inc., New York. Originally published 1925, Bulletin No. 78, U.S. Government Printing Office, Washington, D.C.

Martin, Paul S.
1967 Prehistoric Overkill. In *Pleistocene Extinctions: The Search for a Cause*, edited by Paul S. Martin and H.E. Wright. Yale University Press, New Haven, Connecticut.

1973 The Discovery of America. *Science* 179(4077):969–974.

Masters, Patricia M.
1983 Detection and Assessment of Prehistoric Artifact Sites off the Coast of Southern California. In *Quaternary Coastlines and Marine Archaeology: Towards the Prehistory of Land Bridges and Continental Shelves*, edited by Patricia M. Masters and Nicholas C. Fleming, pp. 189–213. Academic Press, London.

1994 *Archaeological Investigations at Five Sites on the Lower San Luis Rey River, San Diego County, California*, edited by Michael Moratto, pp. A1-A19. INFOTEC Research, Inc., Fresno, California and Gallegos and Associates, Pacific Palisades, California.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, New York.

Moss, Madonna L. and Jon M. Erlandson
1995 Reflections on North American Pacific Coast Prehistory. *Journal of World Prehistory* 9(1):1–46.

National Park Service (NPS)
2019 History of Joshua Tree National Park. Online article. Https://www.nps.gov/jotr/learn/historyculture/parkhistory.htm Accessed May 2023.

Natural Resources Conservation Service (NRCS)
2022 Web Soil Survey. Electronic document, https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, accessed January 5, 2022.

Pourade, Richard F.
1961 *Time of the Bells*. The History of San Diego Volume 2. Union-Tribune Publishing Company, San Diego, California.

1963 The Silver Dons. In *The History of San Diego* (Volume 3). Union-Tribune Publishing Company, San Diego, California.

Rolle, Andrew F.
1969 *California: A History*. 2nd ed. Thomas Y. Crowell Company, New York.

Smith, Claire I.
1996 Joshua Tree… A Unique Village. Hi-Desert magazine. Online article. HISTORICAL HIGHLIGHT: THE HISTORY OF JOSHUA TREE PART 1 - Z107.7 FM Joshua Tree (z1077fm.com) Accessed May 2023.

State Historic Preservation Office (SHPO)
1995 *Instructions for Recording Historical Resources*. Office of Historic Preservation, Sacramento.

Strong, William Duncan
1971 Aboriginal Society in Southern California. Reprint of 1929 *Publications in American Archaeology and Ethnology* No. 26, University of California, Berkeley.

Sutton, Mark Q.
1988 *An Introduction to the Archaeology of the Western Mojave Desert, California.* Archives of California Prehistory Number 14. Coyote Press, Salinas, California.

Sutton, Mark Q., Mark E. Bagsall, Jill K. Gardner, and Mark W. Allen
2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 229-245. Altamira Press, a division of Rowman & Littlefield Publishers, Inc., Lanham, New York, Toronto, Plymouth (UK).

Warren, Claude N. and M.G. Pavesic
1963 Shell Midden Analysis of Site SDI-603 and Ecological Implications for Cultural Development of Batiquitos Lagoon, San Diego County, Los Angeles. *University of California, Los Angeles, Archaeological Survey Annual Report* 1960-1961:246–338.

APPENDIX A

Resumes of Key Personnel

Tracy A. Stropes, MA, RPA

Director/Principal Investigator

BFSA Environmental Services, A Perennial Company
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: tstropes@bfsa.perennialenv.com

Education

Master of Arts, Anthropology, San Diego State University, California **2007**

Bachelor of Science, Anthropology, University of California, Riverside **2000**

Professional Memberships

Register of Professional Archaeologists
Society for California Archaeology
Archaeological Institute of America

Experience

Director/Principal Investigator **March 2009–Present**
BFSA Environmental Services, a Perennial Company **Poway, California**

Project Management of all phases of archaeological investigations for local, state, and federal agencies, field supervision, lithic analysis, National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) site evaluations, and authoring/coauthoring of cultural resource management reports.

Archaeological Principal Investigator **June 2008–February 2009**
TRC Solutions **Irvine, California**

Cultural resource segment of Natural Sciences and Permitting Division; management of archaeological investigations for private companies and local, state, and federal agencies, personnel management, field and laboratory supervision, lithic analysis, Native American consultation and reporting, MRHP and CEQA site evaluations, and authoring/coauthoring cultural resource management reports.

Principal Investigator and Project Archaeologist **June 2006–May 2008**
Archaeological Resource Analysts **Oceanside, California**

As a sub consultant, served as Principal Investigator and Project Archaeologist for several projects for SRS Inc., including field direction, project and personnel management, lab analysis, and authorship of company reports.

Project Archaeologist **September 1996–June 2006**
Gallegos & Associates **Carlsbad, California**

Project management, laboratory management, lithic analysis, field direction, Native American consultation, report authorship/technical editing, and composition of several data recovery/preservation programs for both CEQA and NEPA level compliance.

Project Archaeologist **September 1993–September 1996**
Macko Inc. **Santa Ana, California**

Project management, laboratory management, lithic analysis, field supervision, and report authorship/technical editing.

Archaeological Field Technician **January 1993–September 1993**
Chambers Group Inc. **Irvine, California**

Archaeological excavation, surveying, monitoring, wet screen facilities management, and project logistics.

Archaeological Field Technician **May 1992–September 1992**
John Minch and Associates **San Juan Capistrano, California**

Archaeological excavation, surveying, monitoring, wet screen facilities management, and project logistics.

Professional Accomplishments

Mr. Stropes is a professional archaeologist with over 30 years of experience in cultural resource management. His experience includes over ten years in project management, report authorship, lithic analysis, laboratory management, Native American consultation, and editing for several technical reports for numerous projects throughout southern California. Mr. Stropes has conducted cultural resource surveys, archaeological site testing and evaluations for National Register eligibility and California Environmental Quality Act (CEQA) compliance, mitigation of resources through data recovery for archaeological sites, budget and report preparation, and direction of crews of all sizes for projects ranging in duration from a single day site visit to one year. Mr. Stropes is a Registered Professional Archaeologist and on the list of archaeological consultants qualified to conduct archaeological investigations southern California and the County of San Diego. He has served as project archaeologist for numerous projects and composed data recovery and preservation programs for sites throughout California for both CEQA and NEPA level compliance. He has acted as teaching assistant for archaeological field classes at several sites in Orange (Cypress College), Los Angeles (Cypress College), and San Diego Counties (San Diego State University). In addition, Mr. Stropes was employed to teach discussion sessions for introduction to cultural anthropology classes at SDSU. Internationally, Mr. Stropes has acted as field surveyor for the Natural History Foundation of Orange County & Institucion Nacional de Antropologia y Historia surveying and relocating several sites in northern Baja California. Mr. Stropes has served as the senior project archaeologist on the following select projects.

1900 and 1912 Spindrift Drive: An extensive data recovery and mitigation monitoring program at the Spindrift Site, an important prehistoric archaeological habitation site stretching across the La Jolla area. The project resulted in the discovery of over 20,000 artifacts and nearly 100,000 grams of bulk faunal remains and marine shell, indicating a substantial occupation area (2013-2014).

Ocean Breeze Ranch: An extensive CEQA and Section 106 archaeological investigation of 1,400 acres and 20 cultural resources, both prehistoric and historic, within the Bonsall neighborhood of the county of San Diego. The project included an assessment of sites for eligibility for listing on the California Register of Historical Resources, the County of San Diego Resource Protection Ordinance, and the National Register of Historic Places, which resulted in the identification of four CRHR-eligible, RPO-significant, and NRHP-eligible sites.

Citracado Parkway Extension: An ongoing project in the city of Escondido to mitigate impacts to an important archaeological occupation site. Various archaeological studies have been conducted by BFSA, including CEQA-level survey and testing programs and Section 106 historic resources studies, resulting in the identification of a significant cultural deposit within the project area (2009-present).

Otay Ranch Village 13: An extensive archaeological investigation of nearly 2,000 acres and 84 archaeological sites, both prehistoric and historic, within the county of San Diego, which included prehistoric habitation sites, quarry sites, resource processing sites, and extensive lithic scatters. The project included an assessment of sites for eligibility for listing on the National Register of Historic Places (2016-2018).

Westin Hotel and Timeshare (Grand Pacific Resorts): Data recovery and mitigation monitoring program in the city of Carlsbad consisted of the excavation of 176 one-square-meter archaeological data recovery units which produced thousands of prehistoric artifacts and ecofacts, and resulted in the preservation of a significant prehistoric habitation site. The artifacts recovered from the site presented important new data about the prehistory of the region and Native American occupation in the area (2017).

Cantarini Ranch: A Section 106 archaeological assessment and evaluation for the NRHP of 15 archaeological sites and three isolates, including NRHP-significant prehistoric temporary camp/habitation sites, in the city of Carlsbad (2015-2017).

Citracado Business Park West: An archaeological survey and testing program at a significant prehistoric archaeological site and historic building assessment for a 17-acre project in the city of Escondido. The project resulted in the identification of 82 bedrock milling features, two previously recorded loci and two additional and distinct loci, and approximately 2,000 artifacts (2018).

College Boulevard: A Section 106 archaeological assessment and evaluation for the NRHP of seven archaeological sites, including prehistoric temporary camp/habitation sites, bedrock milling feature sites, and both prehistoric and historic artifact scatters in the city of Carlsbad (2015).

The Everly Subdivision Project: Data recovery and mitigation monitoring program in the city of El Cajon resulted in the identification of a significant prehistoric occupation site from both the Late Prehistoric and Archaic Periods, as well as producing historic artifacts that correspond to the use of the property since 1886. The project produced an unprecedented quantity of artifacts in comparison to the area encompassed by the site, but lacked characteristics that typically reflect intense occupation, indicating that the site was used intensively for food processing (2014-2015).

Andrew J. Garrison, MA, RPA

Project Archaeologist

BFSA Environmental Services, A Perennial Company
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: agarrison@bfsa.perennialenv.com

Education

Master of Arts, Public History, University of California, Riverside **2009**

Bachelor of Science, Anthropology, University of California, Riverside **2005**

Bachelor of Arts, History, University of California, Riverside **2005**

Professional Memberships

Register of Professional Archaeologists
Society for California Archaeology
Society for American Archaeology
California Council for the Promotion of History
Society of Primitive Technology
Lithic Studies Society
California Preservation Foundation
Pacific Coast Archaeological Society

Experience

Project Archaeologist **June 2017–Present**
BFSA Environmental Serives, A Perennial Company **Poway, California**

Project management of all phases of archaeological investigations for local, state, and federal agencies including National Register of Historic Places (NRHP) and California Environmental Quality Act (CEQA) level projects interacting with clients, sub-consultants, and lead agencies. Supervise and perform fieldwork including archaeological survey, monitoring, site testing, comprehensive site records checks, and historic building assessments. Perform and oversee technological analysis of prehistoric lithic assemblages. Author or co-author cultural resource management reports submitted to private clients and lead agencies.

Senior Archaeologist and GIS Specialist **2009–2017**
Scientific Resource Surveys, Inc. **Orange, California**

Served as Project Archaeologist or Principal Investigator on multiple projects, including archaeological monitoring, cultural resource surveys, test excavations, and historic building assessments. Directed projects from start to finish, including budget and personnel hours proposals, field and laboratory direction, report writing, technical editing, Native American consultation, and final report submittal. Oversaw all GIS projects including data collection, spatial analysis, and map creation.

Preservation Researcher **2009**
City of Riverside Modernism Survey **Riverside, California**

Completed DPR Primary, District, and Building, Structure and Object Forms for five sites for a grant-funded project to survey designated modern architectural resources within the City of Riverside.

Information Officer **2005, 2008–2009**
Eastern Information Center (EIC), University of California, Riverside **Riverside, California**

Processed and catalogued restricted and unrestricted archaeological and historical site record forms. Conducted research projects and records searches for government agencies and private cultural resource firms.

Reports/Papers

2019 A Class III Archaeological Study for the Tuscany Valley (TM 33725) Project National Historic Preservation Act Section 106 Compliance, Lake Elsinore, Riverside County, California. Contributing author. Brian F. Smith and Associates, Inc.

2019 A Phase I and II Cultural Resources Assessment for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California. Brian F. Smith and Associates, Inc.

2019 A Phase I Cultural Resources Assessment for the 10575 Foothill Boulevard Project, Rancho Cucamonga, California. Brian F. Smith and Associates, Inc.

2019 Cultural Resources Study for the County Road and East End Avenue Project, City of Chino, San Bernardino County, California. Brian F. Smith and Associates, Inc.

2019 Phase II Cultural Resource Study for the McElwain Project, City of Murrieta, California. Contributing author. Brian F. Smith and Associates, Inc.

2019 A Section 106 (NHPA) Historic Resources Study for the McElwain Project, City of Murrieta, Riverside County, California. Brian F. Smith and Associates, Inc.

2018 Cultural Resource Monitoring Report for the Sewer Group 818 Project, City of San Diego. Brian F. Smith and Associates, Inc.

2018 Phase I Cultural Resource Survey for the Stone Residence Project, 1525 Buckingham Drive, La Jolla, California 92037. Brian F. Smith and Associates, Inc.

2018 A Phase I Cultural Resources Assessment for the Seaton Commerce Center Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Marbella Villa Project, City of Desert Hot Springs, Riverside County, California. Brian F. Smith and Associates, Inc.

2017 Phase I Cultural Resources Survey for TTM 37109, City of Jurupa Valley, County of Riverside. Brian F. Smith and Associates, Inc.

2017 A Phase I Cultural Resources Assessment for the Winchester Dollar General Store Project, Riverside County, California. Brian F. Smith and Associates, Inc.

2016 John Wayne Airport Jet Fuel Pipeline and Tank Farm Archaeological Monitoring Plan. Scientific Resource Surveys, Inc. On file at the County of Orange, California.

2016 Historic Resource Assessment for 220 South Batavia Street, Orange, CA 92868 Assessor's Parcel Number 041-064-4. Scientific Resource Surveys, Inc. Submitted to the City of Orange as part of Mills Act application.

2015 Historic Resource Report: 807-813 Harvard Boulevard, Los Angeles. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2015 Exploring a Traditional Rock Cairn: Test Excavation at CA-SDI-13/RBLI-26: The Rincon Indian Reservation, San Diego County, California. Scientific Resource Surveys, Inc.

2014 Archaeological Monitoring Results: The New Los Angeles Federal Courthouse. Scientific Resource Surveys, Inc. On file at the South Central Coastal Information Center, California State University, Fullerton.

2012 Bolsa Chica Archaeological Project Volume 7, Technological Analysis of Stone Tools, Lithic Technology at Bolsa Chica: Reduction Maintenance and Experimentation. Scientific Resource Surveys, Inc.

Presentations

2017 "Repair and Replace: Lithic Production Behavior as Indicated by the Debitage Assemblage from CA-MRP-283 the Hackney Site." Presented at the Society for California Archaeology Annual Meeting, Fish Camp, California.

2016 "Bones, Stones, and Shell at Bolsa Chica: A Ceremonial Relationship?" Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Markers of Time: Exploring Transitions in the Bolsa Chica Assemblage." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2016 "Dating Duress: Understanding Prehistoric Climate Change at Bolsa Chica." Presented at the Society for California Archaeology Annual Meeting, Ontario, California.

2014 "New Discoveries from an Old Collection: Comparing Recently Identified OGR Beads to Those Previously Analyzed from the Encino Village Site." Presented at the Society for California Archaeology Annual Meeting, Visalia, California.

2012 Bolsa Chica Archaeology: Part Seven: Culture and Chronology. Lithic demonstration of experimental manufacturing techniques at the April meeting of The Pacific Coast Archaeological Society, Irvine, California.

APPENDIX B

Site Record Forms

(Deleted for Public Review; Bound Separately)

APPENDIX C

Archaeological Records Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX D

NAHC Sacred Lands File Search Results

(Deleted for Public Review; Bound Separately)

APPENDIX E

Artifact Catalogs

Joshua Tree Estates
Cultural Resources Assessment
Master Artifact Catalog
Site Temp-1

BFSA Environmental Services

Cat No.	Unit Type	Unit No.	Depth (cm)	Object Type	Object Subtype	Material Type	Material Subtype	Functional Category	Mold	Finish	Diagnostic Elements	Maker's Mark / Backstamp	Manufacturer / Company	Place of Origin	Date (min)	Date (Max)	Condition	Portion	Qty	Wgt (g)
1	STP	1	0-10	Window Glass	Window Glass	Glass	Aqua	Building Material	-	-	-	-	-	-	-	-	Fragment	-	3	4.58
2	STP	1	0-10	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	2.73
3	STP	1	10-20	Window Glass	Window Glass	Glass	Colorless	Building Material	-	-	-	-	-	-	-	-	Fragment	-	1	0.90
4	STP	1	10-20	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	1.03
5	STP	1	10-20	Nail	Indeterminate	Metal	Non-ferrous	Furniture Items	-	-	-	-	-	-	-	-	Complete	-	1	0.99
6	STP	2	0-10	Window Glass	Window Glass	Glass	Aqua	Building Material	-	-	-	-	-	-	-	-	Fragment	-	1	4.85
7	STP	2	0-10	Window Glas	Window Glass	Glass	Colorless	Building Material	-	-	-	-	-	-	-	-	Fragment	-	1	2.18
8	STP	2	0-10	Bottle	Indeterminate	Glass	Amber	Consumer Items	-	-	-	-	-	-	-	-	Fragment	Body	1	0.29
9	STP	2	0-10	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	2.93
10	STP	3	0-10	Window Glass	Wimdow Glass	Glass	Aqua	Building Material	-	-	-	-	-	-	-	-	Fragment	-	45	73.21
11	STP	3	0-10	Vessel	Indeterminate	Glass	Colorless	Consumer Items	-	-	Possible paper label	-	-	-	-	-	Fragment	-	9	8.58
12	STP	3	0-10	Bottle	Indeterminate	Glass	Colorless	Consumer Items	-	-	-	-	-	-	-	-	Fragment	Body	1	2.49
13	STP	3	0-10	Container	Indeterminate	Glass	Colorless	Consumer Items	-	-	-	-	-	-	-	-	Fragment	-	1	0.69
14	STP	3	0-10	Bottle	Indeterminate	Glass	Amber	Consumer Items	-	-	-	-	-	-	-	-	Fragment	Body	1	2.51
15	STP	3	0-10	Bottle	Indeterminate	Glass	Green	Consumer Items	-	-	-	-	-	-	-	-	Fragment	-	1	0.73
16	STP	3	0-10	Vial	Druggist	Glass	Colorless	Household Items	ABM	Small Mouth External Thread	-	-	-	-	1905	2023	Complete	-	1	21.28
17	STP	3	0-10	Can	Beverage	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	1965	1969	Fragment	Pull-tab	1	0.54
18	STP	3	0-10	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	11.84
19	STP	3	0-10	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	3.34
20	STP	3	0-10	Wire	Indeterminate	Metal	Non-ferrous	Hardware Items	-	-	-	-	-	-	-	-	Fragment	-		0.33
21	STP	3	0-10	Can	Food	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Fragment	-	4	1.67
23	STP	3	0-10	Munitions	Bullet Casing	Metal	Non-ferrous	Munitions	-	-	-	-	-	-	-	-	Complete	-	3	1.87
24	STP	3	10-20	Window Glass	Window Glass	Glass	Colorless	Building Material	-	-	-	-	-	-	-	-	Fragment	-	2	1.18
25	STP	3	10-20	Container	Indeterminate	Glass	Colorless	Consumer Items	-	-	-	-	-	-	-	-	Fragment	-	1	0.24
26	STP	3	10-20	Nail	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Fragment	Shaft	1	0.62
27	STP	3	10-20	Nail	Indeterminate	Metal	Non-ferrous	Furniture Items	-	-	-	-	-	-	-	-	Complete	-	1	1.78
28	STP	3	10-20	Munitions	Bullet Casing	Metal	Non-ferrous	Munitions	-	-	"U.S.C. CO.// 32 S. &W. L." EMB on head	-	United States Cartridge Co.		1869	1938	Complete	-	1	2.90
29	STP	4	0-10	Screw	Flat-head	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	2.57
30	STP	4	0-10	Screw	Flat-head	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	17.48
31	STP	4	0-10	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	0.40
32	STP	4	0-10	Window Glass	Window Glass	Glass	Aqua	Building Material	-	-	-	-	-	-	-	-	Fragment	-	2	6.29
33	SC	1	Surface	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	7.33
34	SC	1	Surface	Nail	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	14.79
35	SC	1	Surface	Nail	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	1.44
36	SC	1	Surface	Nail	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	1.63
37	SC	1	Surface	Hinge	Door	Metal	Indeterminate	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	114.05
38	SC	1	Surface	Bottle	Closure	Metal	Non-ferrous	Consumer Items	-	Internal Thread	-	-	-	-	-	-	Complete	-	1	4.35

Cat No.	Unit Type	Unit No.	Depth (cm)	Object Type	Object Subtype	Material Type	Material Subtype	Functional Category	Mold	Finish	Diagnostic Elements	Maker's Mark / Backstamp	Manufacturer / Company	Place of Origin	Date (min)	Date (Max)	Condition	Portion	Qty	Wgt (g)
39	SC	1	Surface	Tableware	Vessel	Ceramic	Porcelain	Kitchen Items	-	-	Tranfer-print, Clear over-glaze, Blue Willow Pattern	-	-	-	-	-	Fragment	Rim	1	3.33
40	SC	1	Surface	Tableware	Vessel	Ceramic	Porcelain	Kitchen Items	-	-	Transfer-print, Clear under-glaze, Blue Willow Pattern	-	-	-	-	-	Fragment	Rim	1	2.73
41	SC	2	Surface	Window Glass	Window Glass	Glass	Aqua	Building Material	-	-	-	-	-	-	-	-	Fragment	-	1	27.73
42	SC	2	Surface	Bottle	Beverage	Glass	Colorless	Consumer Items	ABM	Small Mouth External Thread	-	-	-	-	1905	2023	Fragment	Finish	1	18.44
43	SC	2	Surface	Battery	Beverage	Glass	Colorless	Consumer Items	ABM	-	Stipping around heel	4 (I) 78	Owens-Illinois Glass Co.	Rockport, NY	1978	1978	Fragment	Base	1	37.57
44	SC	2	Surface	Jar	Closure	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	5.96
45	SC	2	Surface	Hardware	Washer	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	9.89
46	SC	2	Surface	Munitions	Bullet Casing	Metal	Non-ferrous	Munitions	-	-	-	XR	-	-	-	-	Complete	-	1	0.76
47	SC	2	Surface	Munitions	Bullet Casing	Metal	Non-ferrous	Munitions	-	-	-	H	-	-	-	-	Complete	-	1	0.50
48	SC	2	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Fragment	-	1	60.94
49	SC	2	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Fragment	-	1	70.10
50	SC	2	Surface	Tableware	Saucer	Ceramic	Stoneware	Kitchen Items	-	-	Clear over-glaze, brown speckled pattern, with brown "*" transfer printed decoration	-	-	-	-	-	Fragment	Rim, body, base	1	15.77
51	SC	2	Surface	Tableware	Vessel	Ceramic	Porcelain	Kitchen Items	-	-	Clear over-glaze	-	-	-	-	-	Fragment	Rim	1	1.84
52	SC	2	Surface	Tableware	Vessel	Ceramic	Earthenware	Kitchen Items	-	-	Forest green under-glaze, clear over-glaze	-	-	-	-	-	Fragment	Rim	1	4.42
53	SC	3	Surface	Nail	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	3	31.94
54	SC	3	Surface	Screw	Square-head	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	2	89.74
55	SC	3	Surface	Screw	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	33.78
56	SC	3	Surface	Nail	Wire-cut	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	2	1.81
57	SC	3	Surface	Screw	Indeterminate	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	2.32
58	SC	3	Surface	Screw	Flat-head	Metal	Non-ferrous	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	0.93
59	SC	3	Surface	Screw	Indeterminate	Metal	Steel	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	12.18
60	SC	3	Surface	Hardware	Upper	Metal	Non-ferrous	Hardware Items	-	-	-	-	-	-	-	-	Fragment	-	1	1.65
61	SC	3	Surface	Hardware	Bracket	Metal	Non-ferrous	Hardware Items	-	-	-	-	-	-	-	-	Fragment	-	2	2.74
62	SC	3	Surface	Hardware	Indeterminate	Metal	Non-ferrous	Hardware Items	-	-	-	-	-	-	-	-	Complete	-	1	9.31
63	SC	3	Surface	Hardware	Hook	Metal	Non-ferrous	Hardware Items	-	-	-	-	-	-	-	-	Complete	-	1	10.57
64	SC	3	Surface	Hinge	Door	Metal	Indeterminate	Building Material	-	-	-	-	-	-	-	-	Complete	-	1	104.60
65	SC	3	Surface	Hardware	Clasp	Metal	Indeterminate	Hardware Items	-	-	-	-	-	-	-	-	Fragment	-	2	59.21
66	SC	4	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	Pull-tab, corrugated	-	-	-	-	-	Fragment	-	1	63.44
67	SC	4	Surface	Bottle	Beverage	Glass	Green	Consumer Items	ABM	-	Ribbed around edge of base	-	-	-	-	-	Fragment	Base	1	30.89
68	SC	4	Surface	Bottle	Beverage	Glass	Green	Consumer Items	ABM	Small Mouth External Thread	-	-	-	-	-	-	Fragment	Finish	1	23.52

Joshua Tree Estates
Cultural Resources Assessment
Master Artifact Catalog
Site Temp-1

BFSA Environmental Services

Cat No.	Unit Type	Unit No.	Depth (cm)	Object Type	Object Subtype	Material Type	Material Subtype	Functional Category	Mold	Finish	Diagnostic Elements	Maker's Mark / Backstamp	Manufacturer / Company	Place of Origin	Date (min)	Date (Max)	Condition	Portion	Qty	Wgt (g)
69	SC	4	Surface	Bottle	Indeterminate	Glass	Colorless	Consumer Items	ABM	-	-	(L)	Latchford-Marble Glass Companuy	-	1925	1939	Fragment	Base	1	30.73
70	SC	4	Surface	Bottle	Indeterminate	Glass	Colorless	Consumer Items	ABM	-	-	21 (I) 76 / 13	Owens-Illinois Glass Co.	Portland, OR	1976	1976	Fragment	Base	1	11.06
71	SC	5	Surface	Jar	Closure	Metal	Non-ferrous	Consumer Items	-	Internal Thread	-	-	-	-	-	-	Complete	-	1	35.73
72	SC	5	Surface	Jar	Clamp	Metal	Non-ferrous	Consumer Items	-	Internal Thread	-	-	-	-	-	-	Complete	-	1	9.50
73	SC	5	Surface	Bottle	Cap	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	2.15
74	SC	5	Surface	Bottle	Closure	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	7.33
75	SC	5	Surface	Bottle	Closure	Metal, Glass	Non-ferrous, colorless	Consumer Items	-	-	-	-	-	-	-	-	Fragment	Lid, finish	1	19.41
76	SC	5	Surface	Bottle	Wine	Glass	Aqua	Consumer Items	ABM; Valve Ejection Mark	-	-	RIUNITE - VILLA BANFI	Villa Banfi	-	-	-	Fragment	Base	1	133.31
77	SC	5	Surface	Vessel	Ashtray	Glass	Amber	Household Items	-	-	"HOTEL// DOWNTOWN" applied color label along rim	-	-	-	-	-	Fragment	Rim	1	10.47
78	SC	5	Surface	Jar	Cosmetic (Salon Cream)	Glass	Milk	Personal Items	-	Large Mouth External Thread	"SAL//…REAM" Applied Color Label on Body	-	-	-	-	-	Fragment	Rim, body	1	25.08
79	SC	6	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	Church-key opened	-	-	-	-	-	Complete	-	1	100.62
80	SC	6	Surface	Tableware	Plate	Ceramic	Earthenware	Kitchen Items	-	-	Clear over-glaze, Floral motif bordering rim, transfer print	-	-	-	-	-	Fragment	Rim	1	14.18
81	SC	6	Surface	Hotelware	Vessel	Ceramic	Earthenware	Kitchen Items	-	-	clear over-glaze	-	-	-	-	-	Fragment	-	1	5.81
82	SC	7	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	178.94
83	SC	7	Surface	Can	Sardine	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	80.18
84	SC	8	Surface	Vessel	Indeterminate	Ceramic	Earthenware	Kitchen Items	-	-	-	-	-	-	-	-	Fragment	Rim, body	1	98.51
85	SC	8	Surface	Tableware	Tea Cup	Ceramic	Stoneware	Kitchen Items	-	-	Double blue line along rim	-	-	-	-	-	Fragment	Rim	1	14.22
86	SC	8	Surface	Munitions	Bullet Casing	Metal	Non-ferrous	Munitions	-	-	-	…/12// C.U.CO	-	-	-	-	Fragment	-	1	6.63
87	SC	8	Surface	Bottle	Indeterminate	Glass	Aqua	Consumer Items	ABM; Valve Ejection Mark	-	-	(I) 78 / 21	Owens-Illinois Glass Co.	-	1978	1978	Fragment	Base	1	144.13
88	SC	9	Surface	Hotelware	Mug	Ceramic	Porcelain	Kitchen Items	-	-	Clear over glaze	-	-	-	-	-	Fragment	Base, body	1	169.54

Joshua Tree Estates
Cultural Resources Assessment
Master Artifact Catalog
Site Temp-2

BFSA Environmental Services

Cat No.	Unit Type	Unit No.	Depth (cm)	Object Type	Object Subtype	Material Type	Material Subtype	Functional Category	Mold	Finish	Diagnostic Elements	Maker's Mark / Backstamp	Manufacturer / Company	Place of Origin	Date (min)	Date (Max)	Condition	Portion	Qty	Wgt (g)
1	SC	1	Surface	Can	Food	Metal	Non-ferrous	Consumer Items	-	-	Pull-tab, "VACUM…SEAL / RETURN…IF TAB LIFTED / … / LIFT UP / PULL UP & BACK"	-	-	-	1962	1966	Fragment	Lid, tab	1	5.81
2	SC	2	Surface	Jar	Lid- Canning	Metal	Non-ferrous	Kitchen Items	-	Internal Thread	-	-	-	-			Fragment	Lid	1	14.08
3	SC	2	Surface	Can	Lid	Metal	Non-ferrous	Consumer Items	-	-	"OPEN WITH ANY CAN OPENER------ SEAL WITH PLASTIC LID"	-	-	-	-	-	Fragment	Lid	1	21.08
4	SC	3	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	62.48
5	SC	3	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	68.19
6	SC	3	Surface	Bottle	Indeterminate	Glass	Amber	Consumer Items	ABM; Owens Suction Scar	-	-	625 / 9	-	-	1905	1959	Fragment	Base	1	41.91
7	SC	3	Surface	Planter	Indeterminate	Ceramic	Terracotta	Gardening Items	-	-	-	-	-	-	-	-	Fragment	Body	1	32.98
8	SC	4	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	-	-	-	-	-	-	-	Complete	-	1	133.11
9	SC	5	Surface	Can	Sanitary	Metal	Non-ferrous	Consumer Items	-	Church-key	-	-	-	-	1935	1979	Complete	-	1	89.55
10	STP	1	0-10	Mirror	Indeterminate	Glass	Colorless	Personal Items	-	-	-	-	-	-	-	-	Fragment	-	1	1.51

APPENDIX F

Confidential Maps

(Deleted for Public Review; Bound Separately)

adkan
ENGINEERS
CIVIL ENGINEERING · SURVEYING · PLANNING
www.adkan.com

TENTATIVE TRACT MAP 20668

PROJ-2023-00129

FINAL HYDROLOGY STUDY

PRELIM DRNSTY-2024-00059

JN: 10754
CLIENT:
J.T. SANTORI VILLA, LLC
DATE PREPARED
11/20/2024
DATE REVISED
8/21/2025

FINAL HYDROLOGY STUDY

Tent. Tract Map 20668

APN0605-051-01
Southeast Corner of Broadway and Sunever
Located in the County of San Bernardino, CA

Prelim DRNSTY-2024-00059
PROJ-2023-00129

Prepared For:
J.T. Santori Villa, LLC
1751 Colorado Blvd. #333
Los Angeles, CA 90041
Tel: 626.673.2672

Prepared by:

adkan ENGINEERS
6879 Airport Drive
Riverside, CA 92504
Tel: 951.688.0241
Fax: 951.688.0599

Job No. 10754
Prepared:
09/15/25

Revised:

RICHARD REAVES, R.C.E. NO. 80614 | 09/15/25 DATE | SEAL

Section 1 - Introduction **2**
1.1 Introduction 2
1.2 Land Use Plan 2
1.3 Purpose of Study 2
1.4 Regional Hydrology 2
Figure 1.1 Location Map 4
Figure 1.2 Land Use Map 5
1.5 Regulatory Findings 6
Figure 1.3 FEMA Floodzone 6
Figure 1.4 DWR Best Available Map 7
Figure 1.5 USGS National Water Information System: Mapper 8
Figure 1.6 USGS Quadrangle 9
Section 2 –Rational Method Hydrology Analysis **10**
Table 2.1 – Precipitation Values 10
2.1 Pre-Development Rational Method Hydrology 10
Table 2.2 Pre-Development Watershed Input Data 11
Table 2.3 Pre-Development Summary Table 11
2.2 Proposed Rational Method Hydrology 12
Table 2.4 Rational Offsite Tributary Summary 12
Table 2.2 Proposed Rational Method Flow Rates 13
Table 2.2 Post-Development Rational Summary 13
2.3 Proposed Drainage Improvements and Preliminary Hydraulics 14
Figure 2.1 – Broadway Preliminary Cross-Section 14
Figure 2.2 – 30’ Drainage Easement Cross-Section 15
Section 3 – Analytical Approach **16**
Section 4 – Conclusion **16**
Appendix A – Existing Rational Hydrology Map ..... **i**
Appendix B – Existing Rational Hydrology Calculations ..... **ii**
Appendix C – Proposed Rational Hydrology Method Map ..... **iii**
Appendix D – Proposed Rational Hydrology Method Calculations ..... **iv**
Appendix E – Supporting Reference Data ..... **v**

Section 1 - Introduction

1.1 Introduction

This report provides a for an analysis of proposed storm water infrastructure, detention facilities and the development of Tentative Tract Map No. 20668. This report provides information on proposed and existing storm flows rates, storm volumes, existing facilities, recommended facilities, and the necessary basin storage and water quality sizing criteria associated with managing the projects storm water run-off while effectively treating the quality of the storm water.

The project site is located in the Joshua Tree community within the unincorporated County of San Bernardino. The project is located South of Broadway between Laferney Avenue and Sunever Road. Figure 1.1 provides a location map for the project.

1.2 Land Use Plan

The proposed project encompasses approximately 81.2 acres. Figure 1.2 provides the development plan for the project. The proposed project consists of the development of 32 single-family lots averaging just over 2 acres. Development remains consistent with the existing Rural Living zoning. Density is currently calculated at 0.4 DU/AC and will be served by streets that will collect runoff from the lots to be conveyed to the corner of Broadway and Sunever.

1.3 Purpose of Study

The purpose of this study is to substantiate the hydrology and hydraulic design of the residential development known as Tentative Tract Map No. 20668. This study will analyze the pre-development and post-development storm water run-on and run-off values and propose storm water design recommendations to ensure the adequate size, volumes, and proper operation of drainage facilities for the proposed project while not adversely affecting downstream facilities and maintaining the conveyance of 100-year storm flows for on-site facilities. Along with the standard analysis of a typical report, this report outlines the specific analysis and back-up calculations necessary for determining the hydrology and hydraulics of the development such that the post-developed condition is equal to or improved when compared to pre-developed condition.

1.4 Regional Hydrology

The project site lies within the Mojave Desert in Southern San Bernardino County. It is roughly 3 miles north of the Joshua Tree National Park and 1.8 Miles North of State Route 62. There are minimal drainage features in the area that are typical for desert regions, this includes alluvial fans and dry stream beds. The flow for the Joshua Tree basin is impeded by the Copper Mountain creating the Coyote Lake (dry) roughly 2.6 miles east.

Figure 1.1 Location Map

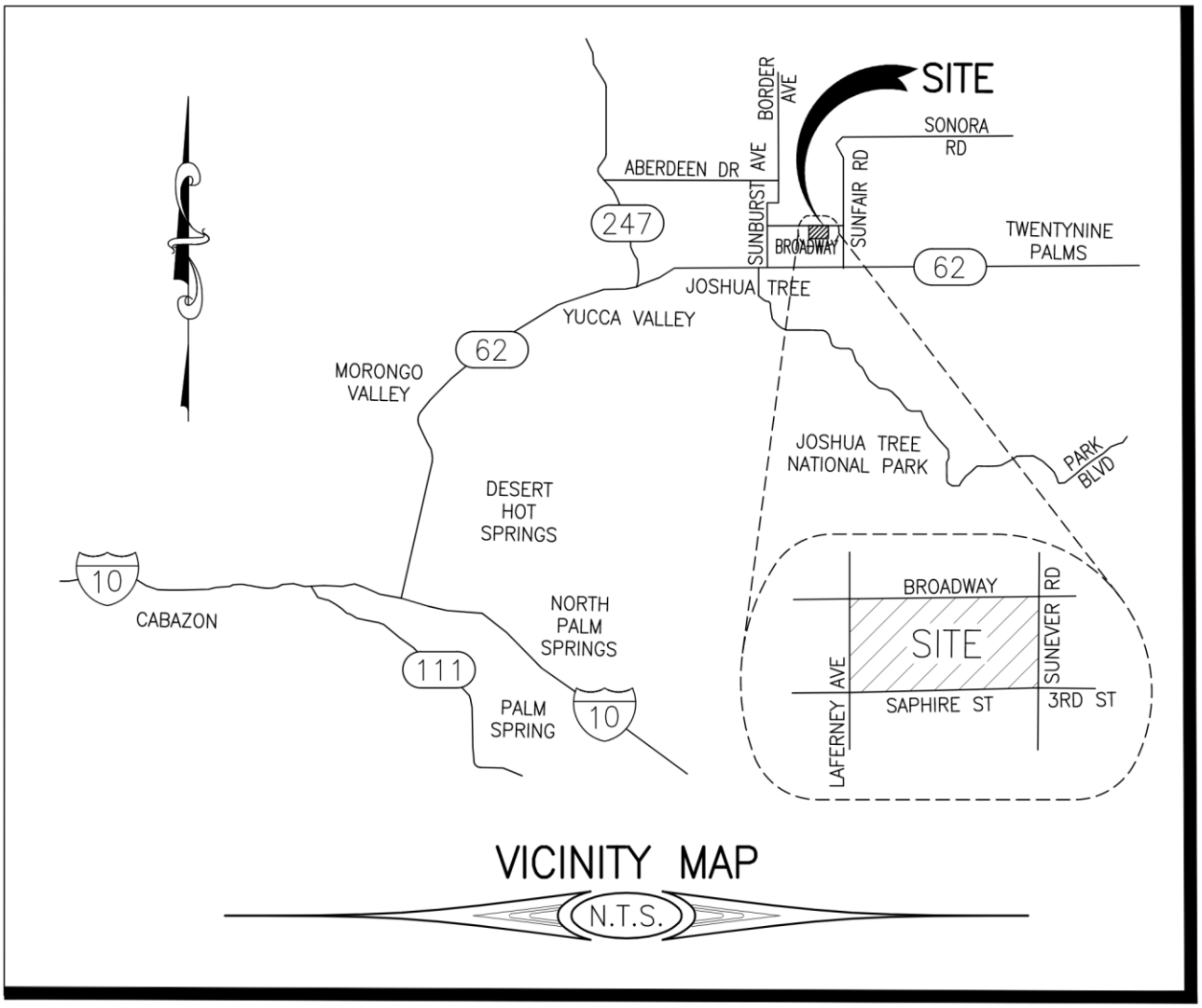
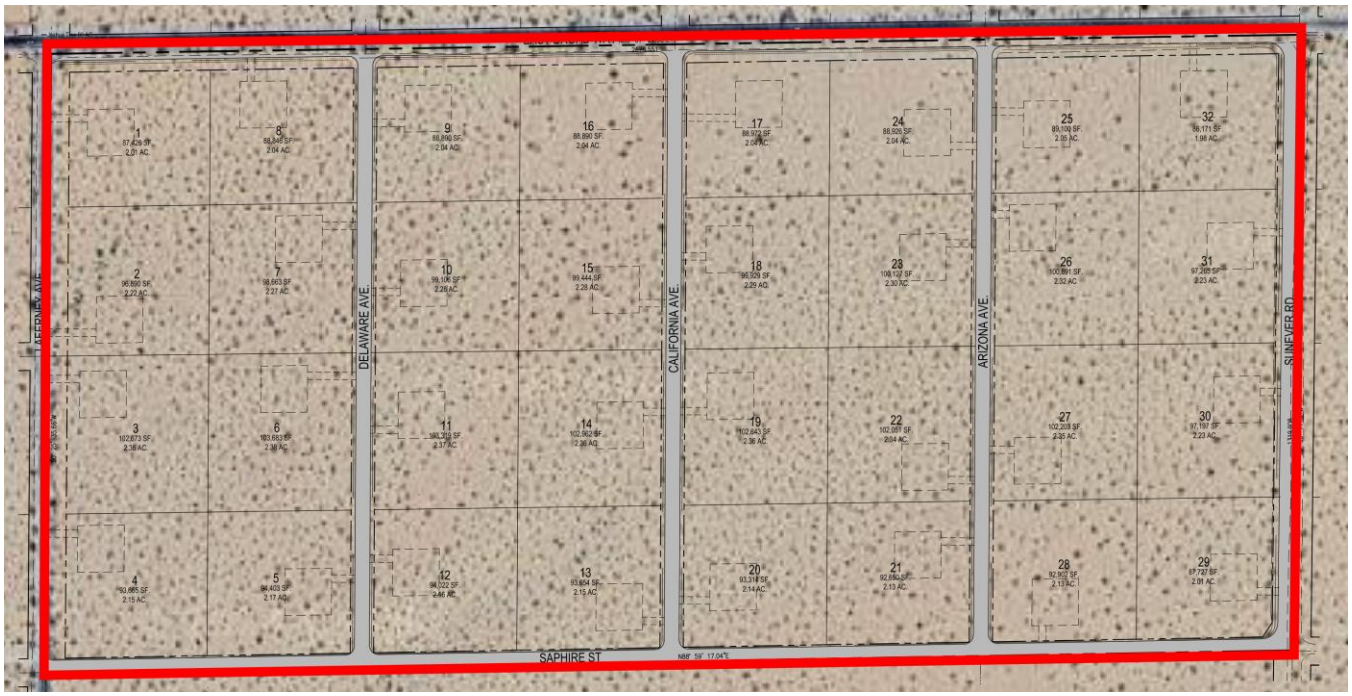


Figure 1.2 Land Use Map



1.5 Regulatory Findings

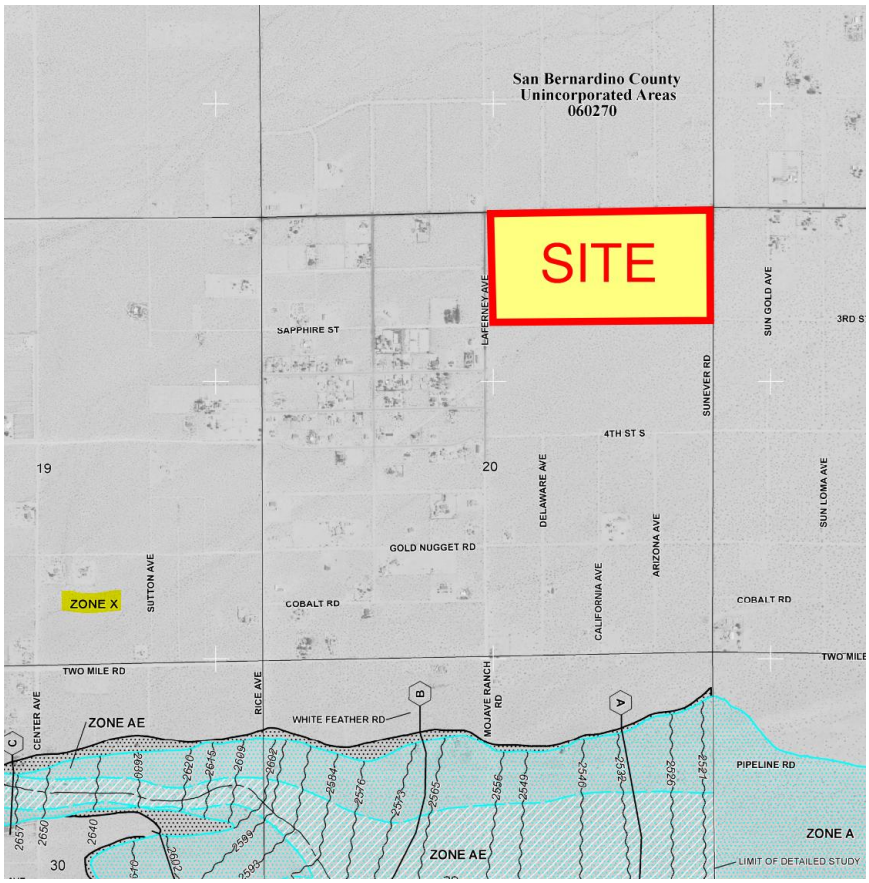
The project site is found in an area where regulatory limits are not typically identified. Excluding environmental studies (JDL, ESA, BIO) the project site does not have defining features identified by FEMA, DWR or USGS.

After reviewing the following figures and supporting data from the public agencies referenced above, it is determined that there are no jurisdictional "Blue Line Streams" within the project boundaries. As referenced elsewhere in this report, there are ephemeral streams that have been identified in the project biological assessment as needing further investigation to determine CDFW impacts, if any, by way of a Jurisdictional Delineation to be completed at a later date.

FEMA

Per the FEMA FIRM Map Panel 06071C8145J, the project site lies within the Zone X designation. These are areas determined to be outside of the 0.2% annual chance floodplain. As such, no further coordination with FEMA will be necessary. The FIRM Map has been included in Appendix E.

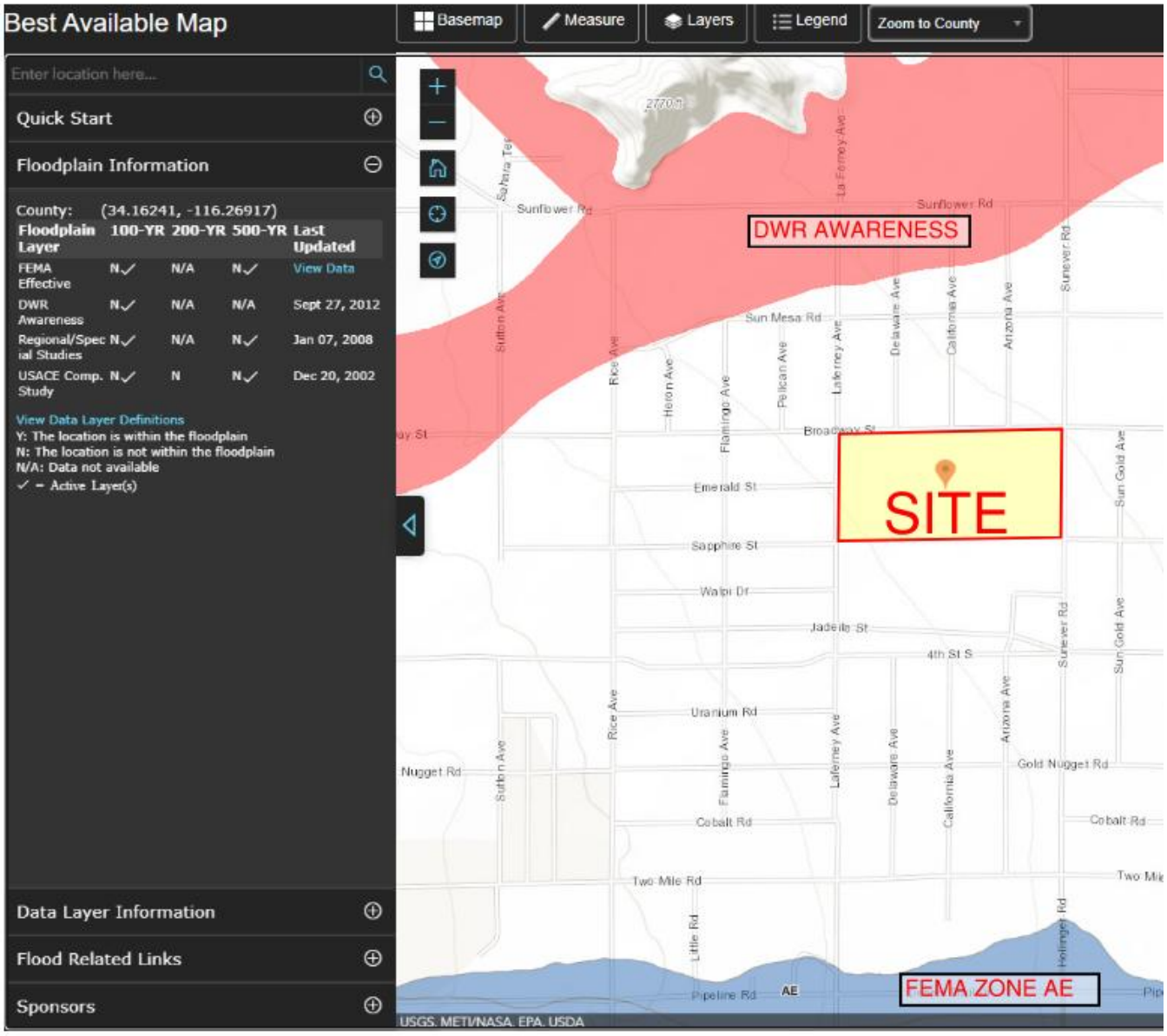
Figure 1.3 FEMA Flood zone



DWR

Research was conducted to find delineation of water jurisdiction for state and federal entities. It was concluded that DWR or ACOE resources were not identified onsite and if further investigation is required, these studies will be provided by the CEQA/Environmental consultant team.

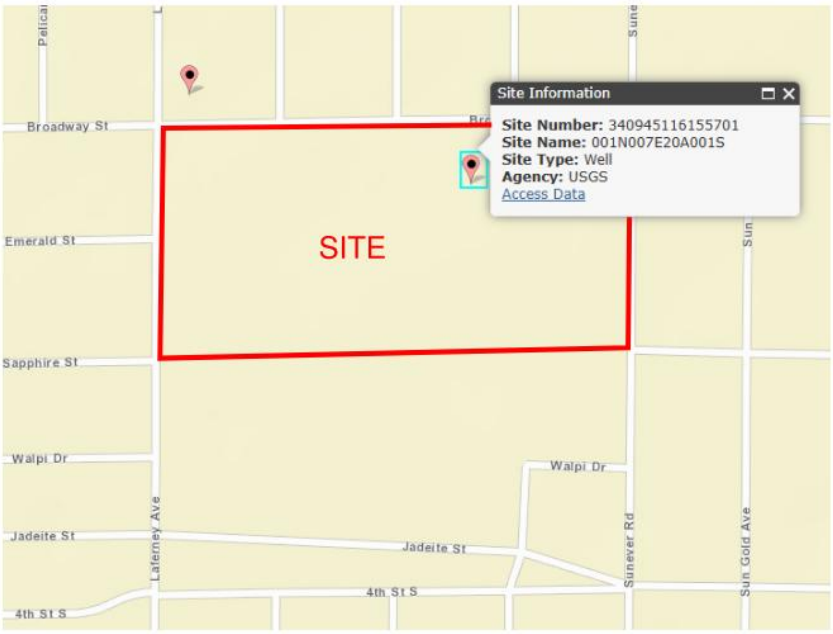
Figure 1.4 DWR Best Available Map



USGS

The 7.5-minute quadrangle map was pulled obtained to verify the existing site features and to confirm the presence of hydrologic features. It was concluded that no blue-line streams exist within the project boundaries. However, it was identified that an abandoned well of unknown depth is located on the east side of the project site.

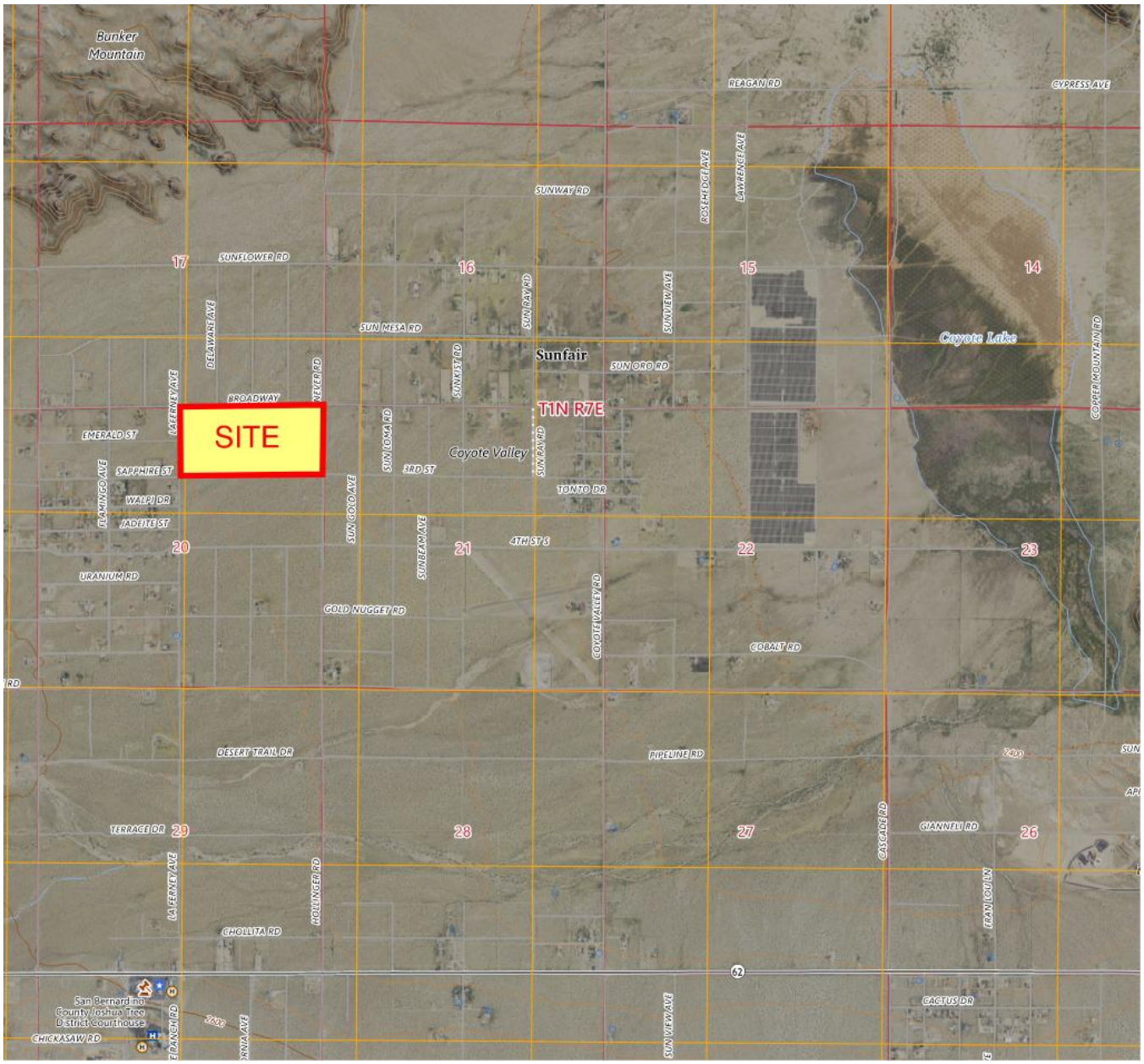
Figure 1.5 USGS National Water Information System: Mapper



DESCRIPTION:

Latitude 34°09'49", Longitude 116°16'00" NAD27
San Bernardino County, California , Hydrologic Unit 18100100
Well depth: not determined.
Land surface altitude: 2,480 feet above NGVD29.
Well completed in "Basin and Range basin-fill aquifers" (N100BSNRGB) national aquifer.

Figure 1.6 USGS Quadrangle



Section 2 –Rational Method Hydrology Analysis

The Rational Method is commonly used for determining park discharge from relatively small drainage areas. The rational method is based on the following equation Q = CIA, where Q is the peak discharge, C is the coefficient of runoff, I is the rainfall intensity, and A is the area of the watershed. Values of these variables necessary to calculate the park discharge are found utilizing the various plates located within the San Bernardino County Flood Control Hydrology Manual. The Rational Method Hydrology is calculated for the 10-year, 25-year and 100-year storm events. The criteria for the protection of storm flow are determined by containing the 10-year storm event with in the tops of street curbs, and the 100-year storm event within the public right of way. Storm drains and/or channels should be considered when either condition is exceeded.

The San Bernardino County Flood Control Manual was the reference for the Rational Hydrology calculations. The Manual provides plates and tables for the interpretation of curves, runoff index, and precipitation values. For this project, the use of NOAA published precipitation values was requested and these are included in Table 2.1 below. The values used for the project calculations are highlighted below. The remaining pertinent values necessary for hydrograph synthesis are included in Appendix E.

Table 2.1 – Precipitation Values

RETURN YR	1HR	3HR	6HR	24HR
2 YR	0.497	0.707	0.873	1.290
5YR	0.727	0.994	1.220	1.840
10YR	0.935	1.250	1.520	2.320
25YR	1.250	1.630	1.960	3.010
50YR	1.530	1.940	2.330	3.580
100 YR	1.840	2.290	2.730	4.200

PER PUBLISHED NOAA POINT PRECIPITATION FREQUENCY ESTIMATES

Antecedent Moisture Content

Based on the arid climate experienced in the Mojave Desert, the San Bernardino County Flood Control has provided direction that the Rational Hydrology calculations shall utilize Figure ADD-1 to identify the applicable Antecedent Moisture Content (AMC). This figure (included in Appendix E) dictates the use of AMC I for assessment of the soil loss and runoff potential of pervious soil.

2.1 Pre-Development Rational Method Hydrology

The existing site is generally uniform falling from the southwest to the northeast. The site is vacant and consists of desert shrubs that naturally occur. Coverage is minimal and per Figure C-3, the existing pervious area had a general Curve Number of 86 representing barren/eroded land as being most appropriate. There is limited development in the upstream tributary and assumed imperviousness was estimated based on the footprint of rooftops and roads relative to the subarea boundary.

Aerial data was used to generate a surface model of the existing terrain and was used to generate the elevation of nodes and locations of ridges and flowlines. These assumptions were confirmed with aerial images overlaid on the topography and compiled to identify the watershed and subarea boundaries.

The project site is bisected by three (3) natural tributaries. Each subarea was tabulated having the physical properties as depicted in Table 2.2. This data was used to organize the calculation input data. The notes represent the sequencing of the different subareas and how they are organized in the hydrology calculations.

Table 2.2 Pre-Development Watershed Input Data

ID	AREA (AC)	US NODE		DS NODE		ELEV Δ (FT)	LENGTH (FT)	SUBAREA				NOTES
		ID	ELEV	ID	ELEV			COVER	IMP	SOIL	CN	
EXA1	6.78	100	2700	101	2674	26	1000	BARREN	0%	B	86	INITIAL AREA
EXA2	193.93	101	2674	102	2509	165	8686	MIXED	2%	B	86	SUBAREA FLOW ADDITION, CONFLUENCE
EXA3	2.87	110	2621	111	2594	27	1000	BARREN	0%	B	86	INITIAL AREA
EXA4	96.12	111	2594	102	2509	85	4978	MIXED	10%	B	86	SUBAREA FLOW ADDITION, CONFLUENCE
EXA5	5.03	102	2509	103	2492	17	916	BARREN	0%	B	86	SUBAREA FLOW ADDITION, CONFLUENCE
EXA6	3.50	120	2576	121	2557	19	1000	BARREN	0%	B	86	INITIAL AREA
EXA7	51.73	121	2557	122	2501	56	3386	MIXED	4%	B	86	SUBAREA FLOW ADDITION
EXA8	5.03	122	2501	103	2492	9	677	BARREN	0%	B	86	SUBAREA FLOW ADDITION, CONFLUENCE
EXA9	43.37	103	2492	400	2467	25	2035	BARREN	0%	B	86	SUBAREA FLOW ADDITION, CONFLUENCE
EXB1	4.82	200	2680	201	2654	26	1000	BARREN	0%	B	86	INITIAL AREA
EXB2	141.95	201	2654	202	2504	150	7929	MIXED	2%	B	86	SUBAREA FLOW ADDITION
EXB3	20.32	202	2504	400	2467	37	2409	BARREN	0%	B	86	SUBAREA FLOW ADDITION, CONFLUENCE
EXC1	9.22	300	2532	301	2512	20	1000	BARREN	0%	B	86	INITIAL AREA
EXC2	16.70	301	2512	302	2492	20	1133	BARREN	0%	B	86	SUBAREA FLOW ADDITION
EXC3	20.04	302	2492	303	2475	17	1203	BARREN	0%	B	86	SUBAREA FLOW ADDITION

The results of the existing rational method hydrology for the north and south drainage courses are shown in Table 2.3 below. Existing Rational Method Hydrology calculations can be found in Appendix “B” of this report.

Table 2.3 Pre-Development Summary Table

WATERSHED	STORM EVENT	Pre-Development		
		FLOW (CFS)	TIME OF CONC (MIN)	VOL (AC-FT)
A-B NODE 400	10 YR	337.07	41.33	19.19
	25 YR	588.20	37.93	30.73
	100 YR	984.65	35.24	47.79
C NODE 303	10 YR	44.61	28.21	1.73
	25 YR	73.07	26.85	2.70
	100 YR	116.65	25.74	4.14

2.2 Proposed Rational Method Hydrology

The proposed project consists of 32 single-family residential homes. The project site will be designed to minimize the impact to the existing flow paths. The homes will be constructed in such a way to allow the existing tributary flows to pass through the project unobstructed, and will be conveyed past streets with Channel Crossings per San Bernardino County Department of Public Works standard drawing 200A. Streets will be constructed to match the existing grade to the greatest extent possible and convey runoff to these proposed crossings. Broadway Avenue will be constructed with a series of channel crossings connecting a trapezoidal channel.

It should be noted the Proposed Rational Method Hydrology flow rates are utilized to size the storm drain facilities to provide a level of storm protection to adequately convey the 100-year storm flow rates. This information is utilized to analyze the hydraulics of the storm facilities for the purposes of sizing storm drain lines, inlets and outlets, spillways, street capacities and culverts for the ultimate experienced flow rates. Preliminary calculations for the sizing of these facilities can be found within Appendix F of this report.

There is significant offsite area that contributes to these flows and the existing hydrology was generated capturing the entire tributary and providing nodes at the proposed project boundary. These nodes represented user input data points later to be used in the assessment of the post-development flows to account for the run-on. A summary of those nodes is included in Table 2.1 below.

Table 2.4 Rational Offsite Tributary Summary

NODE	STORM EVENT	EXISTING		
		FLOW	TIME OF CONC	AREA
		(CFS)	(MIN)	(AC)
102	10 YR	199.54	35.90	299.70
	25 YR	350.55	33.10	
	100 YR	583.85	30.96	
122	10 YR	45.82	33.36	55.23
	25 YR	77.74	31.08	
	100 YR	126.65	29.33	
202	10 YR	84.59	45.32	146.77
	25 YR	159.32	40.55	
	100 YR	273.80	37.22	
302	10 YR	30.64	23.15	25.92
	25 YR	48.24	22.47	
	100 YR	75.05	21.91	

Similarly to the Pre-Development, each subarea was tabulated as shown below in Table 2.2 to organize the input data used for the hydrology calculations.

Table 2.2 Proposed Rational Method Flow Rates

ID	AREA (AC)	US NODE		DS NODE		ELEV Δ	LENGTH	SUBAREA				NOTES
		ID	ELEV	ID	ELEV	(FT)	(FT)	COVER	IMP	SOIL	CN	
NODE 102	299.7	102	2509					MIXED	2%	B	86	USER INPUT
PRA1	19.63	102	2509	150	2492	17	899	MIXED	9%	B	79	SUBAREA FLOW ADDITION, CONFLUENCE
NODE 122	55.23	122	2501					MIXED	2%	B	86	USER INPUT
PRA2	3.32	122	2501	150	2492	9	615	MIXED	10%	B	79	SUBAREA FLOW ADDITION, CONFLUENCE
PRA3	16.01	150	2492	151	2483	9	670	MIXED	10%	B	79	SUBAREA FLOW ADDITION
PRA4	10.25	151	2483	152	2479	4	673	MIXED	10%	B	79	SUBAREA FLOW ADDITION
PRA5	3.40	152	2479	400	2467	12	644	MIXED	10%	B	79	SUBAREA FLOW ADDITION, CONFLUENCE
NODE 202	146.77	202	2504					MIXED	0%	B	86	USER INPUT
PRB1	4.15	202	2504	250	2495	9	569	MIXED	10%	B	79	SUBAREA FLOW ADDITION
PRB2	4.54	250	2495	251	2485	10	770	MIXED	10%	B	79	SUBAREA FLOW ADDITION
PRB3	9.52	251	2485	400	2467	18	1024	MIXED	10%	B	79	SUBAREA FLOW ADDITION, CONFLUENCE
NODE 302	25.92	302	2492					MIXED	0%	B	86	INITIAL AREA
PRC1	7.91	302	2492	350	2486	6	325	MIXED	5%	B	79	SUBAREA FLOW ADDITION
PRC2	14.8	350	2486	303	2475	11	893	MIXED	5%	B	79	SUBAREA FLOW ADDITION

The results of the Post-Development Rational Hydrology are tabulated below. It is a comparison of the Pre-Development and Post-Development flows.

Table 2.2 Post-Development Rational Summary

WATERSHED	STORM EVENT	Pre-Development			Post-Development			ANTICIPATED CHANGE	
		FLOW	TIME OF CONC	VOL	FLOW	TIME OF CONC	VOL	FLOW	VOL
		(CFS)	(MIN)	(AC-FT)	(CFS)	(MIN)	(AC-FT)		(AC-FT)
A-B NODE 400	10 YR	337.07	41.33	19.19	418.62	40.23	23.20	24%	4.0
	25 YR	588.20	37.93	30.73	673.94	38.57	35.80	15%	5.1
	100 YR	984.65	35.24	47.79	1064.07	37.97	55.65	8%	7.9
C NODE 303	10 YR	44.61	28.21	1.73	47.10	26.96	1.75	6%	0.0
	25 YR	73.07	26.85	2.70	76.41	26.31	2.77	5%	0.1
	100 YR	116.65	25.74	4.14	120.94	25.78	4.29	4%	0.2

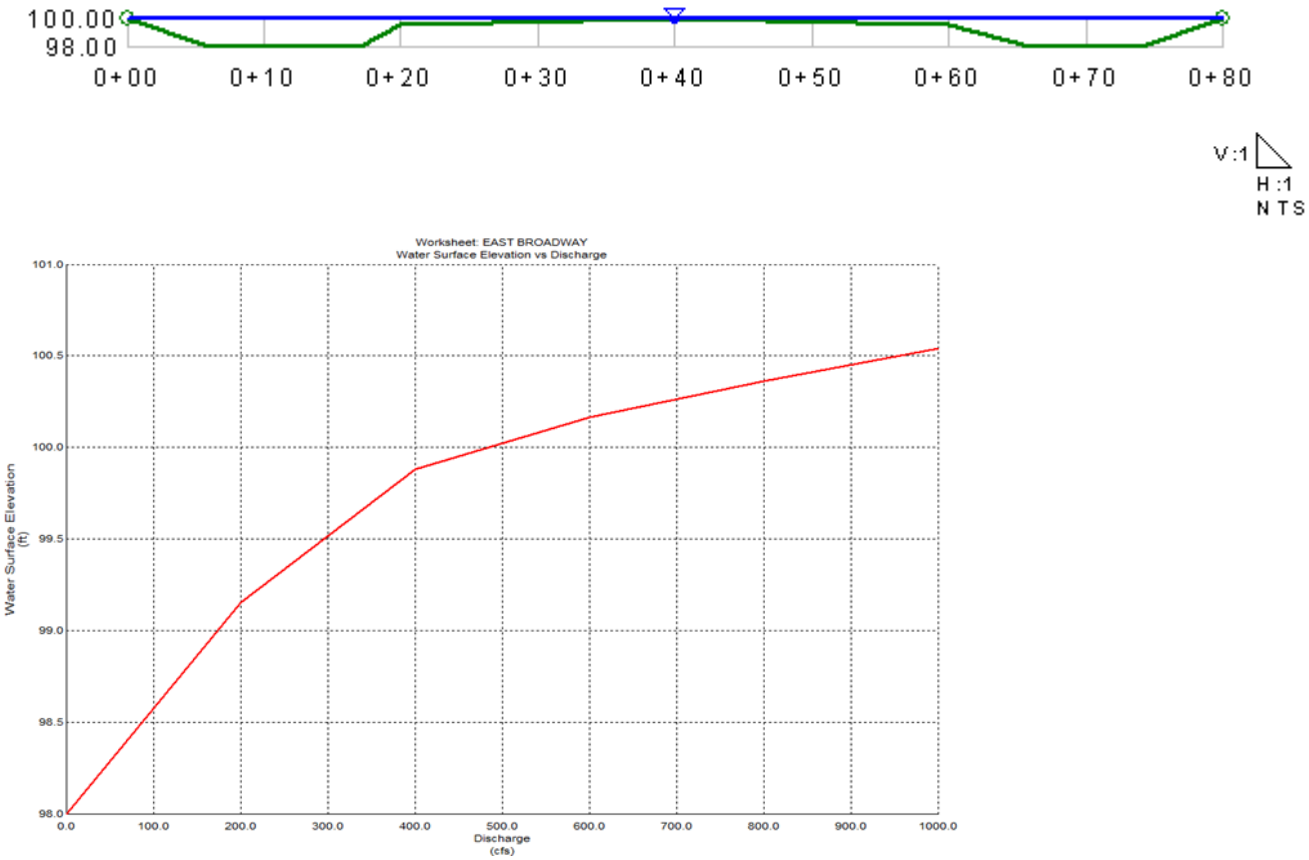
As would be expected with the increase of imperviousness associated with single-family development, the proposed flows and volumes exceed that of the existing. The site will be implementing LID BMPs to capture the runoff of the residential pads. Assuming the increased volume of 4.0 Ac-Ft, which was calculated by a triangular distribution of the flow and time of concentration, this would result in the construction of thirty-two (32) individual rock trenches, each having a volume of 5,445 CF. This interception will lower the run-off to an acceptable level prior to leaving the site. Additional information will be provided in the Final WQMP.

2.3 Proposed Drainage Improvements and Preliminary Hydraulics

The project site will be designed to minimize the impact to the existing flow paths. The homes will be constructed in such a way to allow the existing tributary flows to pass through the project unobstructed, and will be conveyed past streets with Channel Crossings per San Bernardino County Department of Public Works standard drawing 200A. Each lot will be constructed with ornamental landscaping to minimize erosion and maximize flow interception for evapotranspiration and infiltration. Additionally, LID BMPs will be constructed to capture the increased runoff identified in Table 2.2.

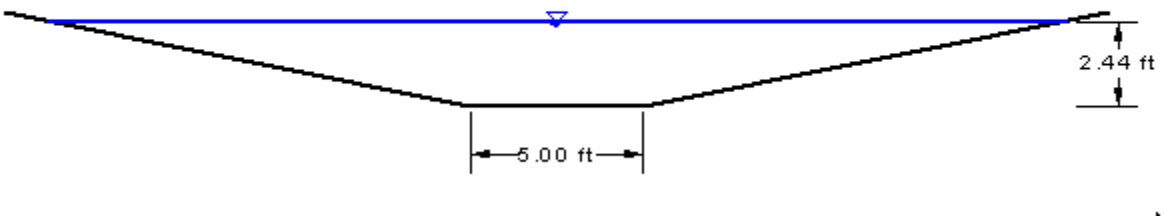
Streets will be constructed to match the existing grade to the greatest extent possible and convey runoff to these proposed crossings. Broadway Avenue will be constructed with a series of channel crossings connecting a trapezoidal channel. Below is a cross section and rating curve with an assumed slope of 1.5% and the Q25 flow of 502.76cfs at Node 152. Further hydraulic calculations will be provided in the Final Hydrology Report including coordination of the culvert crossings.

Figure 2.1 – Broadway Preliminary Cross-Section



There are areas where the natural drainage course conveys offsite flows through the site. These areas will be designed to limit impacts. In areas where these ephemeral streams transect private lots, a drainage easement will be recorded on the map to protect these areas from development and ensure the free passage of flows through the site. The tentative tract map identified the easements as having an undetermined width. Preliminary calculations show that the width will vary with each tributary but the maximum will likely be 30 feet wide. This information will be updated during the preparation of construction documents and the final map specific to each reach.

Figure 2.2 – 30' Drainage Easement Cross-Section



Section 3 – Analytical Approach

The site hydrology was performed utilizing San Bernardino County Flood Control District Hydrology Manual, from which pertinent soil and rainfall information was obtained. See Appendix E of this report for the referenced Plates within the San Bernardino County Flood Control Hydrology Manual.

Rational Method storm flow rates were analyzed by using the "RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM", San Bernardino County Flood Control District 1965 Hydrology Manual, produced by Bondamin Engineering.

Section 4 – Conclusion

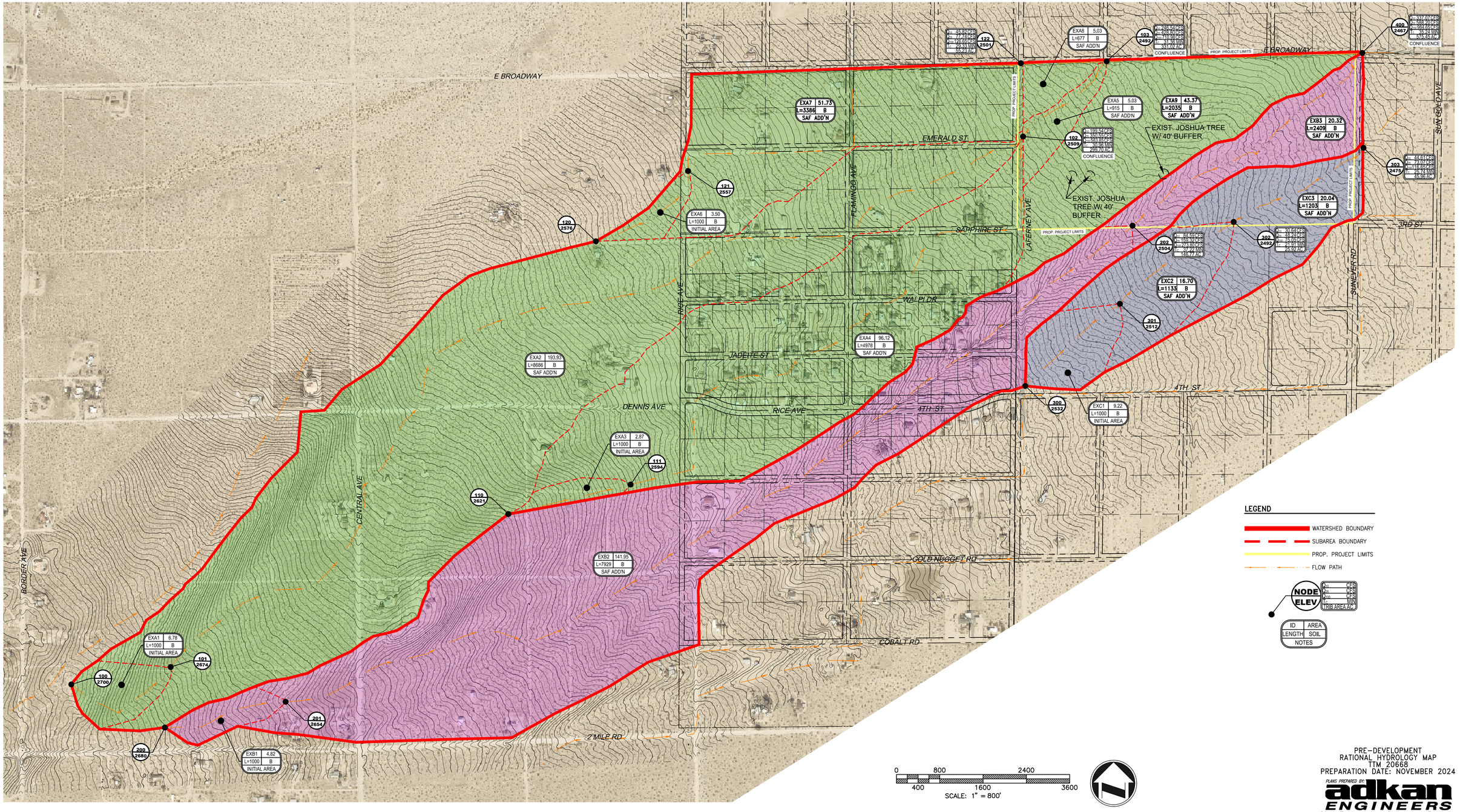
The hydrologic calculations provided within this report substantiate the preliminary hydrology and hydraulic design of the proposed project, Tentative Tract Map No. 20668 and indicate the following:

- The proposed storm drain facilities demonstrate the ability to convey the Rational Hydrology Method 10, 25 and 100 year storm events as required by the San Bernardino County Flood Control Hydrology Manual.

Therefore, it is our conclusion this project **does not** negatively impact the local community or watershed goals and does not adversely affect downstream facilities while maintaining the adequate conveyance of storm flows for on-site facilities to the criteria for the protection of storm flow as determined by the Riverside County Flood Control Hydrology Manual.

Appendix A – Existing Rational Hydrology Map

PRE-DEVELOPMENT
RATIONAL HYDROLOGY MAP
TTM 20668



LEGEND

- WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- PROP. PROJECT LIMITS
- FLOW PATH

NODE / ELEV — Q100 CFS, Q10 CFS, Q100 CFS, Tc MIN, TRIB AREA AC

ID | AREA
LENGTH | SOIL
NOTES

0 800 2400
400 1600 3600
SCALE: 1" = 800'

PRE-DEVELOPMENT
RATIONAL HYDROLOGY MAP
TTM 20668
PREPARATION DATE: NOVEMBER 2024

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 • Fax:(951) 688-0599

U:\PROJECTS\HOME PARADISE\10754 - JOSHUA TREE\ENGINEERING\HYDROLOGY\PRELIMINARY\10754 - PREDEV HYDROLOGY MAP.DWG

PLOT DATE: 12/17/2024 10:32 AM

Appendix B – Existing Rational Hydrology Calculations

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/18/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.935 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2700.000(Ft.)
Bottom (of initial area) elevation = 2674.000(Ft.)
Difference in elevation = 26.000(Ft.)
Slope = 0.02600 s(%)= 2.60
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.029 min.
Rainfall intensity = 2.258(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.698
Subarea runoff = 10.681(CFS)
Total initial stream area = 6.780(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++

Process from Point/Station 101.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2674.000(Ft.)
Downstream point elevation = 2509.000(Ft.)
Channel length thru subarea = 8686.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 63.536(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 63.536(CFS)
Depth of flow = 0.861(Ft.), Average velocity = 5.155(Ft/s)
Channel flow top width = 18.615(Ft.)
Flow Velocity = 5.15(Ft/s)
Travel time = 28.08 min.

Time of concentration = 45.11 min.
Critical depth = 0.922(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.142(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.508
Subarea runoff = 105.641(CFS) for 193.930(Ac.)
Total runoff = 116.322(CFS)
Effective area this stream = 200.71(Ac.)
Total Study Area (Main Stream No. 1) = 200.71(Ac.)
Area averaged Fm value = 0.498(In/Hr)
Depth of flow = 1.187(Ft.), Average velocity = 6.152(Ft/s)
Critical depth = 1.297(Ft.)

++
Process from Point/Station 100.000 to Point/Station 102.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 200.710(Ac.)
Runoff from this stream = 116.322(CFS)
Time of concentration = 45.11 min.
Rainfall intensity = 1.142(In/Hr)
Area averaged loss rate (Fm) = 0.4976(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9807

++
Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2621.000(Ft.)
Bottom (of initial area) elevation = 2594.000(Ft.)
Difference in elevation = 27.000(Ft.)
Slope = 0.02700 s(%)= 2.70
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.901 min.
Rainfall intensity = 2.270(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.699
Subarea runoff = 4.552(CFS)
Total initial stream area = 2.870(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 111.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2594.000(Ft.)
Downstream point elevation = 2509.000(Ft.)
Channel length thru subarea = 4978.000(Ft.)
Channel base width = 10.000(Ft.)

Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 41.580(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 41.580(CFS)
Depth of flow = 0.704(Ft.), Average velocity = 4.367(Ft/s)
Channel flow top width = 17.042(Ft.)
Flow Velocity = 4.37(Ft/s)
Travel time = 19.00 min.
Time of concentration = 35.90 min.
Critical depth = 0.719(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.457(In/Hr)
Rainfall intensity = 1.340(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.592
Subarea runoff = 73.969(CFS) for 96.120(Ac.)
Total runoff = 78.521(CFS)
Effective area this stream = 98.99(Ac.)
Total Study Area (Main Stream No. 1) = 299.70(Ac.)
Area averaged Fm value = 0.458(In/Hr)
Depth of flow = 0.993(Ft.), Average velocity = 5.286(Ft/s)
Critical depth = 1.031(Ft.)

++
Process from Point/Station 110.000 to Point/Station 102.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 98.990(Ac.)
Runoff from this stream = 78.521(CFS)
Time of concentration = 35.90 min.
Rainfall intensity = 1.340(In/Hr)
Area averaged loss rate (Fm) = 0.4582(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9029
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	116.32	200.710	45.11	0.498	1.142
2	78.52	98.990	35.90	0.458	1.340

Qmax(1) =
1.000 * 1.000 * 116.322) +
0.775 * 1.000 * 78.521) + = 177.208
Qmax(2) =
1.307 * 0.796 * 116.322) +
1.000 * 1.000 * 78.521) + = 199.543

Total of 2 streams to confluence:
Flow rates before confluence point:
116.322 78.521
Maximum flow rates at confluence using above data:
177.208 199.543
Area of streams before confluence:
200.710 98.990
Effective area values after confluence:
299.700 258.711
Results of confluence:

Total flow rate = 199.543(CFS)
Time of concentration = 35.900 min.
Effective stream area after confluence = 258.711(Ac.)
Study area average Pervious fraction(Ap) = 0.955
Study area average soil loss rate(Fm) = 0.485(In/Hr)
Study area total (this main stream) = 299.70(Ac.)

++
Process from Point/Station 102.000 to Point/Station 103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2509.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 916.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 199.573(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 199.573(CFS)
Depth of flow = 1.573(Ft.), Average velocity = 7.100(Ft/s)
Channel flow top width = 25.733(Ft.)
Flow Velocity = 7.10(Ft/s)
Travel time = 2.15 min.
Time of concentration = 38.05 min.
Critical depth = 1.734(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 190.142(CFS)
therefore the upstream flow rate of Q = 199.543(CFS) is being used
Rainfall intensity = 1.286(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.561
Subarea runoff = 0.000(CFS) for 5.030(Ac.)
Total runoff = 199.543(CFS)
Effective area this stream = 263.74(Ac.)
Total Study Area (Main Stream No. 1) = 304.73(Ac.)
Area averaged Fm value = 0.485(In/Hr)
Depth of flow = 1.573(Ft.), Average velocity = 7.100(Ft/s)
Critical depth = 1.734(Ft.)

++
Process from Point/Station 100.000 to Point/Station 103.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 263.741(Ac.)
Runoff from this stream = 199.543(CFS)
Time of concentration = 38.05 min.
Rainfall intensity = 1.286(In/Hr)
Area averaged loss rate (Fm) = 0.4850(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9558

++
Process from Point/Station 120.000 to Point/Station 121.000
**** INITIAL AREA EVALUATION ****
_____

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2576.000(Ft.)
Bottom (of initial area) elevation = 2557.000(Ft.)
Difference in elevation = 19.000(Ft.)
Slope = 0.01900 s(%)= 1.90
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.132 min.
Rainfall intensity = 2.161(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.689
Subarea runoff = 5.208(CFS)
Total initial stream area = 3.500(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 121.000 to Point/Station 122.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2557.000(Ft.)
Downstream point elevation = 2501.000(Ft.)
Channel length thru subarea = 3386.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 25.542(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 25.542(CFS)
Depth of flow = 0.542(Ft.), Average velocity = 3.706(Ft/s)
Channel flow top width = 15.422(Ft.)
Flow Velocity = 3.71(Ft/s)
Travel time = 15.23 min.
Time of concentration = 33.36 min.
Critical depth = 0.535(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9600 Max loss rate(Fm)= 0.487(In/Hr)
Rainfall intensity = 1.410(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.588
Subarea runoff = 40.609(CFS) for 51.730(Ac.)
Total runoff = 45.817(CFS)
Effective area this stream = 55.23(Ac.)
Total Study Area (Main Stream No. 1) = 359.96(Ac.)
Area averaged Fm value = 0.488(In/Hr)
Depth of flow = 0.749(Ft.), Average velocity = 4.449(Ft/s)
Critical depth = 0.758(Ft.)

++
Process from Point/Station 122.000 to Point/Station 103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2501.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 677.000(Ft.)

Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 45.850(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 45.850(CFS)
Depth of flow = 0.795(Ft.), Average velocity = 4.125(Ft/s)
Channel flow top width = 17.953(Ft.)
Flow Velocity = 4.12(Ft/s)
Travel time = 2.74 min.
Time of concentration = 36.09 min.
Critical depth = 0.758(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 45.799(CFS)
therefore the upstream flow rate of Q = 45.817(CFS) is being used
Rainfall intensity = 1.334(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.570
Subarea runoff = 0.000(CFS) for 5.030(Ac.)
Total runoff = 45.817(CFS)
Effective area this stream = 60.26(Ac.)
Total Study Area (Main Stream No. 1) = 364.99(Ac.)
Area averaged Fm value = 0.490(In/Hr)
Depth of flow = 0.795(Ft.), Average velocity = 4.124(Ft/s)
Critical depth = 0.758(Ft.)

++
Process from Point/Station 120.000 to Point/Station 103.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 60.260(Ac.)
Runoff from this stream = 45.817(CFS)
Time of concentration = 36.09 min.
Rainfall intensity = 1.334(In/Hr)
Area averaged loss rate (Fm) = 0.4900(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9657
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	199.54	263.741	38.05	0.485	1.286
2	45.82	60.260	36.09	0.490	1.334

Qmax(1) =
1.000 * 1.000 * 199.543) +
0.943 * 1.000 * 45.817) + = 242.734
Qmax(2) =
1.060 * 0.949 * 199.543) +
1.000 * 1.000 * 45.817) + = 246.539

Total of 2 streams to confluence:
Flow rates before confluence point:
199.543 45.817
Maximum flow rates at confluence using above data:
242.734 246.539
Area of streams before confluence:

```
    263.741      60.260
Effective area values after confluence:
    324.001     310.441
Results of confluence:
Total flow rate =    246.539(CFS)
Time of concentration =    36.094 min.
Effective stream area after confluence =    310.441(Ac.)
Study area average Pervious fraction(Ap) =  0.958
Study area average soil loss rate(Fm) =    0.486(In/Hr)
Study area total (this main stream) =     324.00(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  2492.000(Ft.)
Downstream point elevation =  2467.000(Ft.)
Channel length thru subarea  =  2035.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   5.000
Slope or 'Z' of right channel bank =   5.000
Estimated mean flow rate at midpoint of channel =    246.573(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =    246.573(CFS)
Depth of flow =   1.935(Ft.), Average velocity =   6.475(Ft/s)
Channel flow top width =   29.354(Ft.)
Flow Velocity =    6.47(Ft/s)
Travel time  =    5.24 min.
Time of concentration =   41.33 min.
Critical depth =      1.938(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =    230.898(CFS)
therefore the upstream flow rate of Q =    246.539(CFS) is being used
Rainfall intensity =      1.214(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.538
Subarea runoff =      0.000(CFS) for   43.370(Ac.)
Total runoff =    246.539(CFS)
Effective area this stream =      353.81(Ac.)
Total Study Area (Main Stream No. 1) =      408.36(Ac.)
Area averaged Fm value =    0.489(In/Hr)
Depth of flow =   1.935(Ft.), Average velocity =   6.474(Ft/s)
Critical depth =      1.938(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      400.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    353.811(Ac.)
Runoff from this stream =    246.539(CFS)
Time of concentration =   41.33 min.
Rainfall intensity =     1.214(In/Hr)
Area averaged loss rate (Fm) =    0.4886(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9629
```

++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2680.000(Ft.)
Bottom (of initial area) elevation = 2654.000(Ft.)
Difference in elevation = 26.000(Ft.)
Slope = 0.02600 s(%)= 2.60
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.029 min.
Rainfall intensity = 2.258(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.698
Subarea runoff = 7.593(CFS)
Total initial stream area = 4.820(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 201.000 to Point/Station 202.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2654.000(Ft.)
Downstream point elevation = 2504.000(Ft.)
Channel length thru subarea = 7929.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 46.134(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 46.134(CFS)
Depth of flow = 0.725(Ft.), Average velocity = 4.672(Ft/s)
Channel flow top width = 17.248(Ft.)
Flow Velocity = 4.67(Ft/s)
Travel time = 28.29 min.
Time of concentration = 45.32 min.
Critical depth = 0.766(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.138(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.506
Subarea runoff = 76.993(CFS) for 141.950(Ac.)
Total runoff = 84.586(CFS)
Effective area this stream = 146.77(Ac.)
Total Study Area (Main Stream No. 1) = 555.13(Ac.)
Area averaged Fm value = 0.498(In/Hr)
Depth of flow = 1.005(Ft.), Average velocity = 5.602(Ft/s)
Critical depth = 1.078(Ft.)

++
Process from Point/Station 202.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****

```
Upstream point elevation =  2504.000(Ft.)
Downstream point elevation =  2467.000(Ft.)
Channel length thru subarea  =  2409.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   5.000
Slope or 'Z' of right channel bank =   5.000
Estimated mean flow rate at midpoint of channel =     84.632(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =     84.632(CFS)
Depth of flow =   1.062(Ft.), Average velocity =   5.204(Ft/s)
Channel flow top width =   20.621(Ft.)
Flow Velocity =    5.20(Ft/s)
Travel time  =    7.71 min.
Time of concentration =   53.03 min.
Critical depth =      1.078(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =     78.285(CFS)
therefore the upstream flow rate of Q =     84.586(CFS) is being used
Rainfall intensity =      1.019(In/Hr) for a    10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.460
Subarea runoff =      0.000(CFS) for   20.320(Ac.)
Total runoff =     84.586(CFS)
Effective area this stream =      167.09(Ac.)
Total Study Area (Main Stream No. 1) =      575.45(Ac.)
Area averaged Fm value =    0.499(In/Hr)
Depth of flow =   1.062(Ft.), Average velocity =   5.204(Ft/s)
Critical depth =      1.078(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      400.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    167.090(Ac.)
Runoff from this stream =     84.586(CFS)
Time of concentration =   53.03 min.
Rainfall intensity =     1.019(In/Hr)
Area averaged loss rate (Fm) =    0.4988(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9830
Summary of stream data:

Stream Flow rate    Area    TC     Fm      Rainfall Intensity
 No.    (CFS)   (Ac.)      (min) (In/Hr)     (In/Hr)


1    246.54   353.811     41.33    0.489     1.214
2     84.59   167.090     53.03    0.499     1.019
Qmax(1) =
                1.000 *    1.000 *   246.539) +
                1.373 *    0.779 *    84.586) + =     337.073
Qmax(2) =
                0.732 *    1.000 *   246.539) +
                1.000 *    1.000 *    84.586) + =     265.059

Total of 2 streams to confluence:
Flow rates before confluence point:
```

246.539 84.586
Maximum flow rates at confluence using above data:
337.073 265.059
Area of streams before confluence:
353.811 167.090
Effective area values after confluence:
484.039 520.901
Results of confluence:
Total flow rate = 337.073(CFS)
Time of concentration = 41.332 min.
Effective stream area after confluence = 484.039(Ac.)
Study area average Pervious fraction(Ap) = 0.969
Study area average soil loss rate(Fm) = 0.492(In/Hr)
Study area total (this main stream) = 520.90(Ac.)
End of computations, Total Study Area = 575.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.968
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/18/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.295 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2700.000(Ft.)
Bottom (of initial area) elevation = 2674.000(Ft.)
Difference in elevation = 26.000(Ft.)
Slope = 0.02600 s(%)= 2.60
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.029 min.
Rainfall intensity = 3.127(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.754
Subarea runoff = 15.987(CFS)
Total initial stream area = 6.780(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 101.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2674.000(Ft.)
Downstream point elevation = 2509.000(Ft.)
Channel length thru subarea = 8686.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 117.067(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 117.067(CFS)
Depth of flow = 1.191(Ft.), Average velocity = 6.163(Ft/s)
Channel flow top width = 21.906(Ft.)

Flow Velocity = 6.16(Ft/s)
Travel time = 23.49 min.
Time of concentration = 40.52 min.
Critical depth = 1.297(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.705(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.637
Subarea runoff = 202.075(CFS) for 193.930(Ac.)
Total runoff = 218.062(CFS)
Effective area this stream = 200.71(Ac.)
Total Study Area (Main Stream No. 1) = 200.71(Ac.)
Area averaged Fm value = 0.498(In/Hr)
Depth of flow = 1.635(Ft.), Average velocity = 7.337(Ft/s)
Critical depth = 1.813(Ft.)

++
Process from Point/Station 100.000 to Point/Station 102.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 200.710(Ac.)
Runoff from this stream = 218.062(CFS)
Time of concentration = 40.52 min.
Rainfall intensity = 1.705(In/Hr)
Area averaged loss rate (Fm) = 0.4976(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9807

++
Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2621.000(Ft.)
Bottom (of initial area) elevation = 2594.000(Ft.)
Difference in elevation = 27.000(Ft.)
Slope = 0.02700 s(%)= 2.70
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.901 min.
Rainfall intensity = 3.144(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.755
Subarea runoff = 6.810(CFS)
Total initial stream area = 2.870(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 111.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2594.000(Ft.)
Downstream point elevation = 2509.000(Ft.)

Channel length thru subarea = 4978.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 70.525(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 70.525(CFS)
Depth of flow = 0.937(Ft.), Average velocity = 5.122(Ft/s)
Channel flow top width = 19.375(Ft.)
Flow Velocity = 5.12(Ft/s)
Travel time = 16.20 min.
Time of concentration = 33.10 min.
Critical depth = 0.977(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.457(In/Hr)
Rainfall intensity = 1.964(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.690
Subarea runoff = 127.348(CFS) for 96.120(Ac.)
Total runoff = 134.158(CFS)
Effective area this stream = 98.99(Ac.)
Total Study Area (Main Stream No. 1) = 299.70(Ac.)
Area averaged Fm value = 0.458(In/Hr)
Depth of flow = 1.313(Ft.), Average velocity = 6.167(Ft/s)
Critical depth = 1.391(Ft.)

++
Process from Point/Station 110.000 to Point/Station 102.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 98.990(Ac.)
Runoff from this stream = 134.158(CFS)
Time of concentration = 33.10 min.
Rainfall intensity = 1.964(In/Hr)
Area averaged loss rate (Fm) = 0.4582(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9029
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	218.06	200.710	40.52	0.498	1.705
2	134.16	98.990	33.10	0.458	1.964

Qmax(1) =
1.000 * 1.000 * 218.062) +
0.828 * 1.000 * 134.158) + = 329.127
Qmax(2) =
1.215 * 0.817 * 218.062) +
1.000 * 1.000 * 134.158) + = 350.552

Total of 2 streams to confluence:
Flow rates before confluence point:
218.062 134.158
Maximum flow rates at confluence using above data:
329.127 350.552
Area of streams before confluence:
200.710 98.990
Effective area values after confluence:

```
    299.700     262.956
Results of confluence:
Total flow rate =    350.552(CFS)
Time of concentration =    33.099 min.
Effective stream area after confluence =    262.956(Ac.)
Study area average Pervious fraction(Ap) =  0.955
Study area average soil loss rate(Fm) =    0.485(In/Hr)
Study area total (this main stream) =     299.70(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =  2509.000(Ft.)
Downstream point elevation =  2492.000(Ft.)
Channel length thru subarea  =  916.000(Ft.)
Channel base width     =  10.000(Ft.)
Slope or 'Z' of left channel bank =  5.000
Slope or 'Z' of right channel bank =  5.000
Estimated mean flow rate at midpoint of channel =    350.578(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =    350.578(CFS)
Depth of flow =   2.078(Ft.), Average velocity =   8.276(Ft/s)
Channel flow top width =   30.777(Ft.)
Flow Velocity =    8.28(Ft/s)
Travel time  =    1.84 min.
Time of concentration =   34.94 min.
Critical depth =      2.313(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =    339.068(CFS)
therefore the upstream flow rate of Q =    350.552(CFS) is being used
Rainfall intensity =      1.891(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.669
Subarea runoff =      0.000(CFS) for    5.030(Ac.)
Total runoff =    350.552(CFS)
Effective area this stream =      267.99(Ac.)
Total Study Area (Main Stream No. 1) =      304.73(Ac.)
Area averaged Fm value =    0.485(In/Hr)
Depth of flow =   2.078(Ft.), Average velocity =   8.276(Ft/s)
Critical depth =      2.313(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    267.986(Ac.)
Runoff from this stream =    350.552(CFS)
Time of concentration =   34.94 min.
Rainfall intensity =     1.891(In/Hr)
Area averaged loss rate (Fm) =    0.4850(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9558


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      121.000
```

**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2576.000(Ft.)
Bottom (of initial area) elevation = 2557.000(Ft.)
Difference in elevation = 19.000(Ft.)
Slope = 0.01900 s(%)= 1.90
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.132 min.
Rainfall intensity = 2.993(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.747
Subarea runoff = 7.830(CFS)
Total initial stream area = 3.500(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++

Process from Point/Station 121.000 to Point/Station 122.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2557.000(Ft.)
Downstream point elevation = 2501.000(Ft.)
Channel length thru subarea = 3386.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 42.815(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 42.815(CFS)
Depth of flow = 0.722(Ft.), Average velocity = 4.358(Ft/s)
Channel flow top width = 17.219(Ft.)
Flow Velocity = 4.36(Ft/s)
Travel time = 12.95 min.
Time of concentration = 31.08 min.
Critical depth = 0.727(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9600 Max loss rate(Fm)= 0.487(In/Hr)
Rainfall intensity = 2.052(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.686
Subarea runoff = 69.914(CFS) for 51.730(Ac.)
Total runoff = 77.744(CFS)
Effective area this stream = 55.23(Ac.)
Total Study Area (Main Stream No. 1) = 359.96(Ac.)
Area averaged Fm value = 0.488(In/Hr)
Depth of flow = 0.996(Ft.), Average velocity = 5.212(Ft/s)
Critical depth = 1.031(Ft.)

++

Process from Point/Station 122.000 to Point/Station 103.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2501.000(Ft.)

Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 677.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 78.538(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 78.538(CFS)
Depth of flow = 1.061(Ft.), Average velocity = 4.838(Ft/s)
Channel flow top width = 20.607(Ft.)
Flow Velocity = 4.84(Ft/s)
Travel time = 2.33 min.
Time of concentration = 33.41 min.
Critical depth = 1.031(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.951(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.674
Subarea runoff = 1.497(CFS) for 5.030(Ac.)
Total runoff = 79.241(CFS)
Effective area this stream = 60.26(Ac.)
Total Study Area (Main Stream No. 1) = 364.99(Ac.)
Area averaged Fm value = 0.490(In/Hr)
Depth of flow = 1.066(Ft.), Average velocity = 4.851(Ft/s)
Critical depth = 1.047(Ft.)

++
Process from Point/Station 120.000 to Point/Station 103.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 60.260(Ac.)
Runoff from this stream = 79.241(CFS)
Time of concentration = 33.41 min.
Rainfall intensity = 1.951(In/Hr)
Area averaged loss rate (Fm) = 0.4900(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9657
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	350.55	267.986	34.94	0.485	1.891
2	79.24	60.260	33.41	0.490	1.951

Qmax(1) =
1.000 * 1.000 * 350.552) +
0.959 * 1.000 * 79.241) + = 426.525
Qmax(2) =
1.043 * 0.956 * 350.552) +
1.000 * 1.000 * 79.241) + = 428.796

Total of 2 streams to confluence:
Flow rates before confluence point:
350.552 79.241
Maximum flow rates at confluence using above data:
426.525 428.796
Area of streams before confluence:
267.986 60.260

Effective area values after confluence:
328.246 316.503
Results of confluence:
Total flow rate = 428.796(CFS)
Time of concentration = 33.413 min.
Effective stream area after confluence = 316.503(Ac.)
Study area average Pervious fraction(Ap) = 0.958
Study area average soil loss rate(Fm) = 0.486(In/Hr)
Study area total (this main stream) = 328.25(Ac.)

++
Process from Point/Station 103.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 2035.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 428.825(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 428.825(CFS)
Depth of flow = 2.525(Ft.), Average velocity = 7.505(Ft/s)
Channel flow top width = 35.254(Ft.)
Flow Velocity = 7.50(Ft/s)
Travel time = 4.52 min.
Time of concentration = 37.93 min.
Critical depth = 2.563(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 420.008(CFS)
therefore the upstream flow rate of Q = 428.796(CFS) is being used
Rainfall intensity = 1.785(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.654
Subarea runoff = 0.000(CFS) for 43.370(Ac.)
Total runoff = 428.796(CFS)
Effective area this stream = 359.87(Ac.)
Total Study Area (Main Stream No. 1) = 408.36(Ac.)
Area averaged Fm value = 0.489(In/Hr)
Depth of flow = 2.525(Ft.), Average velocity = 7.505(Ft/s)
Critical depth = 2.563(Ft.)

++
Process from Point/Station 100.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 359.873(Ac.)
Runoff from this stream = 428.796(CFS)
Time of concentration = 37.93 min.
Rainfall intensity = 1.785(In/Hr)
Area averaged loss rate (Fm) = 0.4885(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9627

++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2680.000(Ft.)
Bottom (of initial area) elevation = 2654.000(Ft.)
Difference in elevation = 26.000(Ft.)
Slope = 0.02600 s(%)= 2.60
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.029 min.
Rainfall intensity = 3.127(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.754
Subarea runoff = 11.365(CFS)
Total initial stream area = 4.820(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 201.000 to Point/Station 202.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2654.000(Ft.)
Downstream point elevation = 2504.000(Ft.)
Channel length thru subarea = 7929.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 85.373(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 85.373(CFS)
Depth of flow = 1.010(Ft.), Average velocity = 5.617(Ft/s)
Channel flow top width = 20.099(Ft.)
Flow Velocity = 5.62(Ft/s)
Travel time = 23.52 min.
Time of concentration = 40.55 min.
Critical depth = 1.086(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.704(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.637
Subarea runoff = 147.951(CFS) for 141.950(Ac.)
Total runoff = 159.316(CFS)
Effective area this stream = 146.77(Ac.)
Total Study Area (Main Stream No. 1) = 555.13(Ac.)
Area averaged Fm value = 0.498(In/Hr)
Depth of flow = 1.397(Ft.), Average velocity = 6.715(Ft/s)
Critical depth = 1.531(Ft.)

++
Process from Point/Station 202.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2504.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 2409.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 159.360(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 159.360(CFS)
Depth of flow = 1.473(Ft.), Average velocity = 6.230(Ft/s)
Channel flow top width = 24.731(Ft.)
Flow Velocity = 6.23(Ft/s)
Travel time = 6.44 min.
Time of concentration = 47.00 min.
Critical depth = 1.531(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 156.062(CFS)
therefore the upstream flow rate of Q = 159.316(CFS) is being used
Rainfall intensity = 1.537(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.608
Subarea runoff = 0.000(CFS) for 20.320(Ac.)
Total runoff = 159.316(CFS)
Effective area this stream = 167.09(Ac.)
Total Study Area (Main Stream No. 1) = 575.45(Ac.)
Area averaged Fm value = 0.499(In/Hr)
Depth of flow = 1.473(Ft.), Average velocity = 6.229(Ft/s)
Critical depth = 1.531(Ft.)

++
Process from Point/Station 200.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 167.090(Ac.)
Runoff from this stream = 159.316(CFS)
Time of concentration = 47.00 min.
Rainfall intensity = 1.537(In/Hr)
Area averaged loss rate (Fm) = 0.4988(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9830
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	428.80	359.873	37.93	0.489	1.785
2	159.32	167.090	47.00	0.499	1.537

Qmax(1) =
1.000 * 1.000 * 428.796) +
1.240 * 0.807 * 159.316) + = 588.196
Qmax(2) =
0.808 * 1.000 * 428.796) +
1.000 * 1.000 * 159.316) + = 505.871

Total of 2 streams to confluence:
Flow rates before confluence point:
428.796 159.316

Maximum flow rates at confluence using above data:
588.196 505.871
Area of streams before confluence:
359.873 167.090
Effective area values after confluence:
494.730 526.963
Results of confluence:
Total flow rate = 588.196(CFS)
Time of concentration = 37.932 min.
Effective stream area after confluence = 494.730(Ac.)
Study area average Pervious fraction(Ap) = 0.969
Study area average soil loss rate(Fm) = 0.492(In/Hr)
Study area total (this main stream) = 526.96(Ac.)
End of computations, Total Study Area = 575.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.968
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/18/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.840 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2700.000(Ft.)
Bottom (of initial area) elevation = 2674.000(Ft.)
Difference in elevation = 26.000(Ft.)
Slope = 0.02600 s(%)= 2.60
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.029 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.797
Subarea runoff = 24.016(CFS)
Total initial stream area = 6.780(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 101.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2674.000(Ft.)
Downstream point elevation = 2509.000(Ft.)
Channel length thru subarea = 8686.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 199.067(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 199.067(CFS)
Depth of flow = 1.562(Ft.), Average velocity = 7.155(Ft/s)
Channel flow top width = 25.621(Ft.)

Flow Velocity = 7.16(Ft/s)
Travel time = 20.23 min.
Time of concentration = 37.26 min.
Critical depth = 1.734(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 2.568(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.726
Subarea runoff = 350.019(CFS) for 193.930(Ac.)
Total runoff = 374.035(CFS)
Effective area this stream = 200.71(Ac.)
Total Study Area (Main Stream No. 1) = 200.71(Ac.)
Area averaged Fm value = 0.498(In/Hr)
Depth of flow = 2.132(Ft.), Average velocity = 8.493(Ft/s)
Critical depth = 2.406(Ft.)

++
Process from Point/Station 100.000 to Point/Station 102.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 200.710(Ac.)
Runoff from this stream = 374.035(CFS)
Time of concentration = 37.26 min.
Rainfall intensity = 2.568(In/Hr)
Area averaged loss rate (Fm) = 0.4976(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9807

++
Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2621.000(Ft.)
Bottom (of initial area) elevation = 2594.000(Ft.)
Difference in elevation = 27.000(Ft.)
Slope = 0.02700 s(%)= 2.70
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.901 min.
Rainfall intensity = 4.467(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.798
Subarea runoff = 10.227(CFS)
Total initial stream area = 2.870(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 111.000 to Point/Station 102.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2594.000(Ft.)
Downstream point elevation = 2509.000(Ft.)

Channel length thru subarea = 4978.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 115.008(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 115.008(CFS)
Depth of flow = 1.213(Ft.), Average velocity = 5.903(Ft/s)
Channel flow top width = 22.128(Ft.)
Flow Velocity = 5.90(Ft/s)
Travel time = 14.05 min.
Time of concentration = 30.96 min.
Critical depth = 1.281(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.457(In/Hr)
Rainfall intensity = 2.924(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.759
Subarea runoff = 209.474(CFS) for 96.120(Ac.)
Total runoff = 219.701(CFS)
Effective area this stream = 98.99(Ac.)
Total Study Area (Main Stream No. 1) = 299.70(Ac.)
Area averaged Fm value = 0.458(In/Hr)
Depth of flow = 1.686(Ft.), Average velocity = 7.073(Ft/s)
Critical depth = 1.828(Ft.)

++
Process from Point/Station 110.000 to Point/Station 102.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 98.990(Ac.)
Runoff from this stream = 219.701(CFS)
Time of concentration = 30.96 min.
Rainfall intensity = 2.924(In/Hr)
Area averaged loss rate (Fm) = 0.4582(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9029
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	374.03	200.710	37.26	0.498	2.568
2	219.70	98.990	30.96	0.458	2.924

Qmax(1) =
1.000 * 1.000 * 374.035) +
0.856 * 1.000 * 219.701) + = 562.025
Qmax(2) =
1.172 * 0.831 * 374.035) +
1.000 * 1.000 * 219.701) + = 583.848

Total of 2 streams to confluence:
Flow rates before confluence point:
374.035 219.701
Maximum flow rates at confluence using above data:
562.025 583.848
Area of streams before confluence:
200.710 98.990
Effective area values after confluence:

```
    299.700     265.732
Results of confluence:
Total flow rate =    583.848(CFS)
Time of concentration =    30.956 min.
Effective stream area after confluence =    265.732(Ac.)
Study area average Pervious fraction(Ap) =  0.955
Study area average soil loss rate(Fm) =    0.485(In/Hr)
Study area total (this main stream) =     299.70(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____________________________________________________________________________
Upstream point elevation =  2509.000(Ft.)
Downstream point elevation =  2492.000(Ft.)
Channel length thru subarea  =   916.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   5.000
Slope or 'Z' of right channel bank =   5.000
Estimated mean flow rate at midpoint of channel =    583.891(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    3.000(Ft.)
Flow(q) thru subarea =    583.891(CFS)
Depth of flow =   2.650(Ft.), Average velocity =   9.476(Ft/s)
Channel flow top width =   36.501(Ft.)
Flow Velocity =    9.48(Ft/s)
Travel time  =    1.61 min.
Time of concentration =   32.57 min.
Critical depth =      3.000(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.507(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =    569.527(CFS)
therefore the upstream flow rate of Q =    583.848(CFS) is being used
Rainfall intensity =      2.822(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.745
Subarea runoff =      0.000(CFS) for    5.030(Ac.)
Total runoff =    583.848(CFS)
Effective area this stream =      270.76(Ac.)
Total Study Area (Main Stream No. 1) =      304.73(Ac.)
Area averaged Fm value =    0.485(In/Hr)
Depth of flow =   2.650(Ft.), Average velocity =   9.476(Ft/s)
Critical depth =      3.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      103.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    270.762(Ac.)
Runoff from this stream =    583.848(CFS)
Time of concentration =   32.57 min.
Rainfall intensity =     2.822(In/Hr)
Area averaged loss rate (Fm) =    0.4850(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9558


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      120.000 to Point/Station      121.000
```

**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2576.000(Ft.)
Bottom (of initial area) elevation = 2557.000(Ft.)
Difference in elevation = 19.000(Ft.)
Slope = 0.01900 s(%)= 1.90
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 18.132 min.
Rainfall intensity = 4.252(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.793
Subarea runoff = 11.796(CFS)
Total initial stream area = 3.500(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++

Process from Point/Station 121.000 to Point/Station 122.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2557.000(Ft.)
Downstream point elevation = 2501.000(Ft.)
Channel length thru subarea = 3386.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 69.256(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 69.256(CFS)
Depth of flow = 0.936(Ft.), Average velocity = 5.038(Ft/s)
Channel flow top width = 19.364(Ft.)
Flow Velocity = 5.04(Ft/s)
Travel time = 11.20 min.
Time of concentration = 29.33 min.
Critical depth = 0.969(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9600 Max loss rate(Fm)= 0.487(In/Hr)
Rainfall intensity = 3.036(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.755
Subarea runoff = 114.857(CFS) for 51.730(Ac.)
Total runoff = 126.653(CFS)
Effective area this stream = 55.23(Ac.)
Total Study Area (Main Stream No. 1) = 359.96(Ac.)
Area averaged Fm value = 0.488(In/Hr)
Depth of flow = 1.285(Ft.), Average velocity = 5.998(Ft/s)
Critical depth = 1.359(Ft.)

++

Process from Point/Station 122.000 to Point/Station 103.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2501.000(Ft.)

Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 677.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 128.649(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 128.649(CFS)
Depth of flow = 1.370(Ft.), Average velocity = 5.570(Ft/s)
Channel flow top width = 23.704(Ft.)
Flow Velocity = 5.57(Ft/s)
Travel time = 2.03 min.
Time of concentration = 31.36 min.
Critical depth = 1.359(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 2.898(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.748
Subarea runoff = 3.929(CFS) for 5.030(Ac.)
Total runoff = 130.582(CFS)
Effective area this stream = 60.26(Ac.)
Total Study Area (Main Stream No. 1) = 364.99(Ac.)
Area averaged Fm value = 0.490(In/Hr)
Depth of flow = 1.381(Ft.), Average velocity = 5.594(Ft/s)
Critical depth = 1.375(Ft.)

++
Process from Point/Station 120.000 to Point/Station 103.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 60.260(Ac.)
Runoff from this stream = 130.582(CFS)
Time of concentration = 31.36 min.
Rainfall intensity = 2.898(In/Hr)
Area averaged loss rate (Fm) = 0.4900(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9657
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	583.85	270.762	32.57	0.485	2.822
2	130.58	60.260	31.36	0.490	2.898

Qmax(1) =
1.000 * 1.000 * 583.848) +
0.969 * 1.000 * 130.582) + = 710.330
Qmax(2) =
1.032 * 0.963 * 583.848) +
1.000 * 1.000 * 130.582) + = 710.978

Total of 2 streams to confluence:
Flow rates before confluence point:
583.848 130.582
Maximum flow rates at confluence using above data:
710.330 710.978
Area of streams before confluence:
270.762 60.260

Effective area values after confluence:
331.022 320.987
Results of confluence:
Total flow rate = 710.978(CFS)
Time of concentration = 31.360 min.
Effective stream area after confluence = 320.987(Ac.)
Study area average Pervious fraction(Ap) = 0.958
Study area average soil loss rate(Fm) = 0.486(In/Hr)
Study area total (this main stream) = 331.02(Ac.)

++
Process from Point/Station 103.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 2035.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 713.295(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 713.295(CFS)
Depth of flow = 3.165(Ft.), Average velocity = 8.743(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 40.000(Ft.)
Flow Velocity = 8.74(Ft/s)
Travel time = 3.88 min.
Time of concentration = 35.24 min.
Critical depth = 3.281(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 2.671(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.735
Subarea runoff = 4.580(CFS) for 43.370(Ac.)
Total runoff = 715.557(CFS)
Effective area this stream = 364.36(Ac.)
Total Study Area (Main Stream No. 1) = 408.36(Ac.)
Area averaged Fm value = 0.488(In/Hr)
Depth of flow = 3.168(Ft.), Average velocity = 8.754(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 3.281(Ft.)

++
Process from Point/Station 100.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 364.357(Ac.)
Runoff from this stream = 715.557(CFS)
Time of concentration = 35.24 min.
Rainfall intensity = 2.671(In/Hr)
Area averaged loss rate (Fm) = 0.4885(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9627

++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2680.000(Ft.)
Bottom (of initial area) elevation = 2654.000(Ft.)
Difference in elevation = 26.000(Ft.)
Slope = 0.02600 s(%)= 2.60
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.029 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.797
Subarea runoff = 17.073(CFS)
Total initial stream area = 4.820(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 201.000 to Point/Station 202.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2654.000(Ft.)
Downstream point elevation = 2504.000(Ft.)
Channel length thru subarea = 7929.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 145.466(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 145.466(CFS)
Depth of flow = 1.333(Ft.), Average velocity = 6.546(Ft/s)
Channel flow top width = 23.334(Ft.)
Flow Velocity = 6.55(Ft/s)
Travel time = 20.19 min.
Time of concentration = 37.22 min.
Critical depth = 1.469(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 2.570(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.726
Subarea runoff = 256.723(CFS) for 141.950(Ac.)
Total runoff = 273.796(CFS)
Effective area this stream = 146.77(Ac.)
Total Study Area (Main Stream No. 1) = 555.13(Ac.)
Area averaged Fm value = 0.498(In/Hr)
Depth of flow = 1.833(Ft.), Average velocity = 7.796(Ft/s)
Critical depth = 2.047(Ft.)

++
Process from Point/Station 202.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****

```
Upstream point elevation =  2504.000(Ft.)
Downstream point elevation =  2467.000(Ft.)
Channel length thru subarea  =  2409.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   5.000
Slope or 'Z' of right channel bank =   5.000
Estimated mean flow rate at midpoint of channel =    274.777(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =   3.000(Ft.)
Flow(q) thru subarea =    274.777(CFS)
Depth of flow =   1.932(Ft.), Average velocity =   7.233(Ft/s)
Channel flow top width =   29.322(Ft.)
Flow Velocity =    7.23(Ft/s)
Travel time  =    5.55 min.
Time of concentration =   42.77 min.
Critical depth =      2.047(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000     Max loss rate(Fm)=     0.507(In/Hr)
Rainfall intensity =      2.332(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.707
Subarea runoff =      1.883(CFS) for   20.320(Ac.)
Total runoff =    275.679(CFS)
Effective area this stream =      167.09(Ac.)
Total Study Area (Main Stream No. 1) =      575.45(Ac.)
Area averaged Fm value =    0.499(In/Hr)
Depth of flow =   1.935(Ft.), Average velocity =   7.239(Ft/s)
Critical depth =      2.063(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      400.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    167.090(Ac.)
Runoff from this stream =    275.679(CFS)
Time of concentration =   42.77 min.
Rainfall intensity =     2.332(In/Hr)
Area averaged loss rate (Fm) =    0.4988(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9830
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)      (min) (In/Hr)     (In/Hr)


1    715.56   364.357     35.24    0.488      2.671
2    275.68   167.090     42.77    0.499      2.332
Qmax(1) =
                1.000 *    1.000 *   715.557) +
                1.185 *    0.824 *   275.679) + =     984.649
Qmax(2) =
                0.845 *    1.000 *   715.557) +
                1.000 *    1.000 *   275.679) + =     880.211

Total of 2 streams to confluence:
Flow rates before confluence point:
    715.557     275.679
Maximum flow rates at confluence using above data:
     984.649     880.211
```

Area of streams before confluence:
364.357 167.090
Effective area values after confluence:
502.028 531.447
Results of confluence:
Total flow rate = 984.649(CFS)
Time of concentration = 35.239 min.
Effective stream area after confluence = 502.028(Ac.)
Study area average Pervious fraction(Ap) = 0.969
Study area average soil loss rate(Fm) = 0.492(In/Hr)
Study area total (this main stream) = 531.45(Ac.)
End of computations, Total Study Area = 575.45 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.968
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/18/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.935 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2532.000(Ft.)
Bottom (of initial area) elevation = 2512.000(Ft.)
Difference in elevation = 20.000(Ft.)
Slope = 0.02000 s(%)= 2.00
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.946 min.
Rainfall intensity = 2.176(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.690
Subarea runoff = 13.849(CFS)
Total initial stream area = 9.220(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++

Process from Point/Station 301.000 to Point/Station 302.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2512.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 1133.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 22.287(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 22.287(CFS)
Depth of flow = 0.493(Ft.), Average velocity = 3.626(Ft/s)
Channel flow top width = 14.931(Ft.)
Flow Velocity = 3.63(Ft/s)
Travel time = 5.21 min.

Time of concentration = 23.15 min.
Critical depth = 0.492(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.821(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.649
Subarea runoff = 16.791(CFS) for 16.700(Ac.)
Total runoff = 30.639(CFS)
Effective area this stream = 25.92(Ac.)
Total Study Area (Main Stream No. 1) = 25.92(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 0.589(Ft.), Average velocity = 4.015(Ft/s)
Critical depth = 0.594(Ft.)

++
Process from Point/Station 302.000 to Point/Station 303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2475.000(Ft.)
Channel length thru subarea = 1203.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 37.669(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 37.669(CFS)
Depth of flow = 0.703(Ft.), Average velocity = 3.968(Ft/s)
Channel flow top width = 17.026(Ft.)
Flow Velocity = 3.97(Ft/s)
Travel time = 5.05 min.
Time of concentration = 28.21 min.
Critical depth = 0.672(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.586(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.612
Subarea runoff = 13.968(CFS) for 20.040(Ac.)
Total runoff = 44.607(CFS)
Effective area this stream = 45.96(Ac.)
Total Study Area (Main Stream No. 1) = 45.96(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 0.771(Ft.), Average velocity = 4.178(Ft/s)
Critical depth = 0.750(Ft.)
End of computations, Total Study Area = 45.96 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/18/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.295 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2532.000(Ft.)
Bottom (of initial area) elevation = 2512.000(Ft.)
Difference in elevation = 20.000(Ft.)
Slope = 0.02000 s(%)= 2.00
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.946 min.
Rainfall intensity = 3.015(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.749
Subarea runoff = 20.805(CFS)
Total initial stream area = 9.220(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++
Process from Point/Station 301.000 to Point/Station 302.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2512.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 1133.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 34.573(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 34.573(CFS)
Depth of flow = 0.630(Ft.), Average velocity = 4.171(Ft/s)
Channel flow top width = 16.303(Ft.)

Flow Velocity = 4.17(Ft/s)
Travel time = 4.53 min.
Time of concentration = 22.47 min.
Critical depth = 0.641(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 2.575(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.723
Subarea runoff = 27.437(CFS) for 16.700(Ac.)
Total runoff = 48.242(CFS)
Effective area this stream = 25.92(Ac.)
Total Study Area (Main Stream No. 1) = 25.92(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 0.757(Ft.), Average velocity = 4.623(Ft/s)
Critical depth = 0.781(Ft.)

++
Process from Point/Station 302.000 to Point/Station 303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2475.000(Ft.)
Channel length thru subarea = 1203.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 60.685(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 60.685(CFS)
Depth of flow = 0.910(Ft.), Average velocity = 4.583(Ft/s)
Channel flow top width = 19.100(Ft.)
Flow Velocity = 4.58(Ft/s)
Travel time = 4.37 min.
Time of concentration = 26.85 min.
Critical depth = 0.891(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 2.274(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.699
Subarea runoff = 24.828(CFS) for 20.040(Ac.)
Total runoff = 73.069(CFS)
Effective area this stream = 45.96(Ac.)
Total Study Area (Main Stream No. 1) = 45.96(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 1.005(Ft.), Average velocity = 4.841(Ft/s)
Critical depth = 1.000(Ft.)
End of computations, Total Study Area = 45.96 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 86.0

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date - August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/18/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.840 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++

Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Initial subarea data:
Initial area flow distance = 1000.000(Ft.)
Top (of initial area) elevation = 2532.000(Ft.)
Bottom (of initial area) elevation = 2512.000(Ft.)
Difference in elevation = 20.000(Ft.)
Slope = 0.02000 s(%)= 2.00
TC = k(0.518)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.946 min.
Rainfall intensity = 4.283(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.793
Subarea runoff = 31.329(CFS)
Total initial stream area = 9.220(Ac.)
Pervious area fraction = 1.000
Initial area Fm value = 0.507(In/Hr)

++

Process from Point/Station 301.000 to Point/Station 302.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2512.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 1133.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 53.219(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 53.219(CFS)
Depth of flow = 0.798(Ft.), Average velocity = 4.763(Ft/s)
Channel flow top width = 17.985(Ft.)

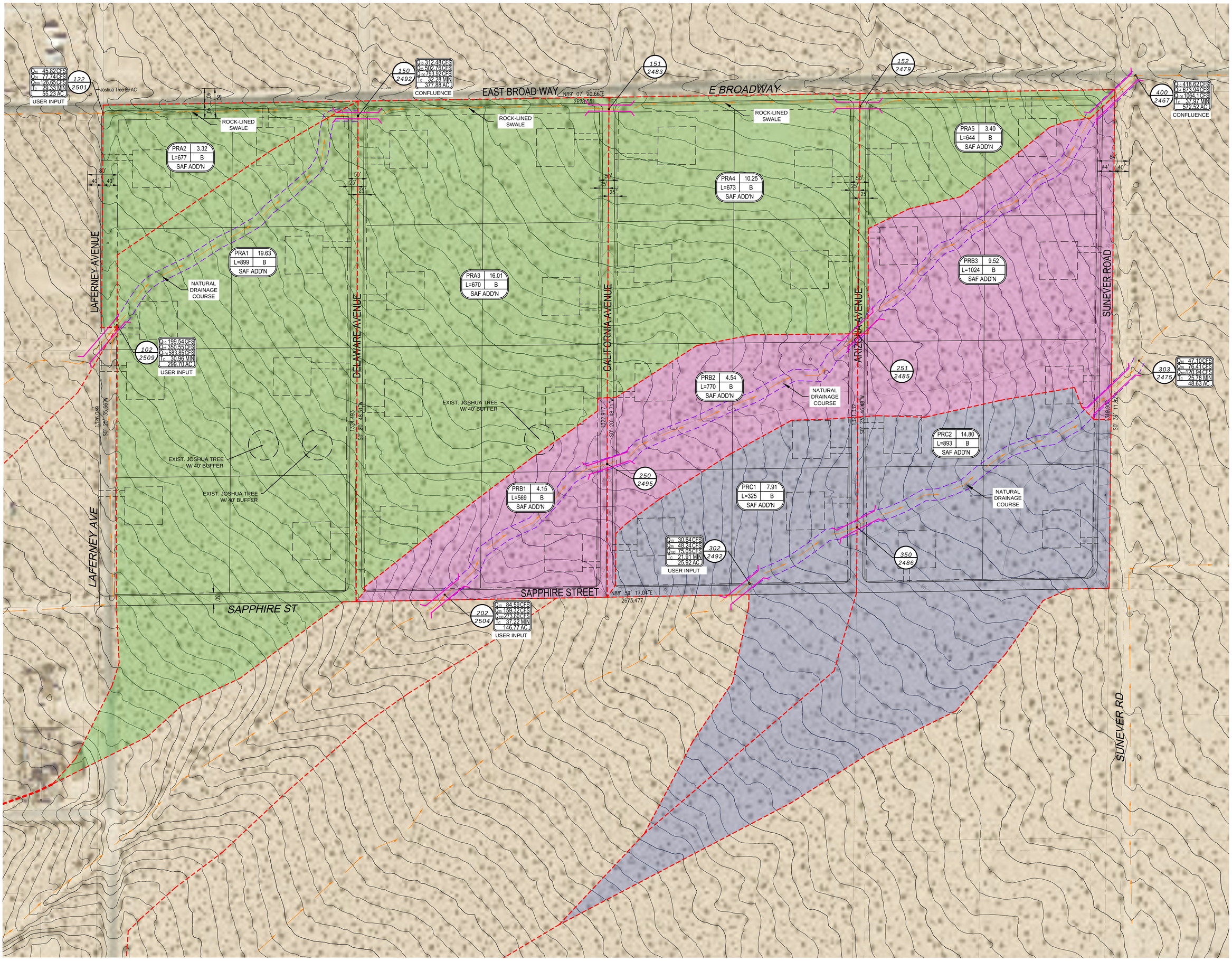
Flow Velocity = 4.76(Ft/s)
Travel time = 3.96 min.
Time of concentration = 21.91 min.
Critical depth = 0.828(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 3.724(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.777
Subarea runoff = 43.718(CFS) for 16.700(Ac.)
Total runoff = 75.047(CFS)
Effective area this stream = 25.92(Ac.)
Total Study Area (Main Stream No. 1) = 25.92(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 0.961(Ft.), Average velocity = 5.278(Ft/s)
Critical depth = 1.016(Ft.)

++
Process from Point/Station 302.000 to Point/Station 303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2475.000(Ft.)
Channel length thru subarea = 1203.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 95.884(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 95.884(CFS)
Depth of flow = 1.159(Ft.), Average velocity = 5.238(Ft/s)
Channel flow top width = 21.590(Ft.)
Flow Velocity = 5.24(Ft/s)
Travel time = 3.83 min.
Time of concentration = 25.74 min.
Critical depth = 1.156(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 3.327(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.763
Subarea runoff = 41.601(CFS) for 20.040(Ac.)
Total runoff = 116.648(CFS)
Effective area this stream = 45.96(Ac.)
Total Study Area (Main Stream No. 1) = 45.96(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 1.283(Ft.), Average velocity = 5.539(Ft/s)
Critical depth = 1.297(Ft.)
End of computations, Total Study Area = 45.96 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged SCS curve number = 86.0

Appendix C – Proposed Rational Hydrology Method Map

POST-DEVELOPMENT
RATIONAL HYDROLOGY MAP
TTM 20668



SCALE: 1" = 100'

LEGEND

- WATERSHED BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- DRAINAGE EASEMENT
- CHANNEL CROSSINGS (STD 200A)

NODE / ELEV — Q, CFS, Q, CFS, Q, CFS, Tc, MIN, TRIB AREA AC

ID	AREA
LENGTH	SOIL
NOTES	

POST-DEVELOPMENT
RATIONAL HYDROLOGY MAP
TTM 20668
PREPARATION DATE: NOVEMBER 2024

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 • Fax:(951) 688-0599

U:\PROJECTS\HOME PARADISE\10754 - JOSHUA TREE\ENGINEERING\HYDROLOGY\PRELIMINARY\10754 - POSTDEV HYDROLOGY MAP.DWG

PLOT DATE: 3/11/2025 9:33 AM

Appendix D – Proposed Rational Hydrology Method Calculations

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/19/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.935 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 100.000 to Point/Station 102.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.486(In/Hr) for a 10.0 year storm
User specified values are as follows:
TC = 30.96 min. Rain intensity = 1.49(In/Hr)
Total area this stream = 299.70(Ac.)
Total Study Area (Main Stream No. 1) = 299.70(Ac.)
Total runoff = 199.54(CFS)

++
Process from Point/Station 102.000 to Point/Station 150.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2509.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 899.000(Ft.)
Channel base width = 5.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 231.937(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 19.630(Ft.)
Flow(q) thru subarea = 231.937(CFS)
Depth of flow = 2.014(Ft.), Average velocity = 7.642(Ft/s)
Channel flow top width = 25.139(Ft.)
Flow Velocity = 7.64(Ft/s)
Travel time = 1.96 min.
Time of concentration = 32.92 min.
Critical depth = 2.219(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9100 Max loss rate(Fm)= 0.596(In/Hr)

Rainfall intensity = 1.423(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.582
Subarea runoff = 64.849(CFS) for 19.630(Ac.)
Total runoff = 264.389(CFS)
Effective area this stream = 319.33(Ac.)
Total Study Area (Main Stream No. 1) = 319.33(Ac.)
Area averaged Fm value = 0.503(In/Hr)
Depth of flow = 2.135(Ft.), Average velocity = 7.903(Ft/s)
Critical depth = 2.359(Ft.)

++
Process from Point/Station 102.000 to Point/Station 150.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 319.330(Ac.)
Runoff from this stream = 264.389(CFS)
Time of concentration = 32.92 min.
Rainfall intensity = 1.423(In/Hr)
Area averaged loss rate (Fm) = 0.5033(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9757

++
Process from Point/Station 120.000 to Point/Station 122.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.543(In/Hr) for a 10.0 year storm
User specified values are as follows:
TC = 29.33 min. Rain intensity = 1.54(In/Hr)
Total area this stream = 55.23(Ac.)
Total Study Area (Main Stream No. 1) = 374.56(Ac.)
Total runoff = 45.82(CFS)

++
Process from Point/Station 122.000 to Point/Station 150.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2501.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 615.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 46.969(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 46.969(CFS)
Depth of flow = 1.136(Ft.), Average velocity = 2.636(Ft/s)
Channel flow top width = 21.362(Ft.)
Flow Velocity = 2.64(Ft/s)
Travel time = 3.89 min.
Time of concentration = 33.22 min.
Critical depth = 0.766(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00

Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
Rainfall intensity = 1.414(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.580
Subarea runoff = 2.230(CFS) for 3.320(Ac.)
Total runoff = 48.050(CFS)
Effective area this stream = 58.55(Ac.)
Total Study Area (Main Stream No. 1) = 377.88(Ac.)
Area averaged Fm value = 0.502(In/Hr)
Depth of flow = 1.150(Ft.), Average velocity = 2.653(Ft/s)
Critical depth = 0.781(Ft.)

++
Process from Point/Station 122.000 to Point/Station 150.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 58.550(Ac.)
Runoff from this stream = 48.050(CFS)
Time of concentration = 33.22 min.
Rainfall intensity = 1.414(In/Hr)
Area averaged loss rate (Fm) = 0.5025(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9755
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	264.39	319.330	32.92	0.503	1.423
2	48.05	58.550	33.22	0.502	1.414

Qmax(1) =
1.000 * 1.000 * 264.389) +
1.010 * 0.991 * 48.050) + = 312.475
Qmax(2) =
0.990 * 1.000 * 264.389) +
1.000 * 1.000 * 48.050) + = 309.870

Total of 2 streams to confluence:
Flow rates before confluence point:
264.389 48.050
Maximum flow rates at confluence using above data:
312.475 309.870
Area of streams before confluence:
319.330 58.550
Effective area values after confluence:
377.356 377.880
Results of confluence:
Total flow rate = 312.475(CFS)
Time of concentration = 32.921 min.
Effective stream area after confluence = 377.356(Ac.)
Study area average Pervious fraction(Ap) = 0.976
Study area average soil loss rate(Fm) = 0.503(In/Hr)
Study area total (this main stream) = 377.88(Ac.)

++
Process from Point/Station 150.000 to Point/Station 151.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2483.000(Ft.)
Channel length thru subarea = 670.000(Ft.)
Channel base width = 10.000(Ft.)

Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 312.501(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 312.501(CFS)
Depth of flow = 2.950(Ft.), Average velocity = 4.281(Ft/s)
Channel flow top width = 39.496(Ft.)
Flow Velocity = 4.28(Ft/s)
Travel time = 2.61 min.
Time of concentration = 35.53 min.
Critical depth = 2.188(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 298.306(CFS)
therefore the upstream flow rate of Q = 312.475(CFS) is being used
Rainfall intensity = 1.349(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.562
Subarea runoff = 0.000(CFS) for 16.010(Ac.)
Total runoff = 312.475(CFS)
Effective area this stream = 393.37(Ac.)
Total Study Area (Main Stream No. 1) = 393.89(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 2.950(Ft.), Average velocity = 4.281(Ft/s)
Critical depth = 2.188(Ft.)

++
Process from Point/Station 151.000 to Point/Station 152.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2483.000(Ft.)
Downstream point elevation = 2479.000(Ft.)
Channel length thru subarea = 673.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 312.507(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 312.507(CFS)
Depth of flow = 3.468(Ft.), Average velocity = 3.335(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 40.000(Ft.)
Flow Velocity = 3.33(Ft/s)
Travel time = 3.36 min.
Time of concentration = 38.89 min.
Critical depth = 2.188(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 275.250(CFS)
therefore the upstream flow rate of Q = 312.475(CFS) is being used
Rainfall intensity = 1.267(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified

rational method)(Q=KCIA) is C = 0.538
Subarea runoff = 0.000(CFS) for 10.250(Ac.)
Total runoff = 312.475(CFS)
Effective area this stream = 403.62(Ac.)
Total Study Area (Main Stream No. 1) = 404.14(Ac.)
Area averaged Fm value = 0.509(In/Hr)
Depth of flow = 3.468(Ft.), Average velocity = 3.335(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 2.188(Ft.)

++
Process from Point/Station 152.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2479.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 644.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 312.516(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 312.516(CFS)
Depth of flow = 1.963(Ft.), Average velocity = 8.036(Ft/s)
Channel flow top width = 29.628(Ft.)
Flow Velocity = 8.04(Ft/s)
Travel time = 1.34 min.
Time of concentration = 40.23 min.
Critical depth = 2.188(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 266.485(CFS)
therefore the upstream flow rate of Q = 312.475(CFS) is being used
Rainfall intensity = 1.237(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.529
Subarea runoff = 0.000(CFS) for 3.400(Ac.)
Total runoff = 312.475(CFS)
Effective area this stream = 407.02(Ac.)
Total Study Area (Main Stream No. 1) = 407.54(Ac.)
Area averaged Fm value = 0.509(In/Hr)
Depth of flow = 1.963(Ft.), Average velocity = 8.036(Ft/s)
Critical depth = 2.188(Ft.)

++
Process from Point/Station 102.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 407.016(Ac.)
Runoff from this stream = 312.475(CFS)
Time of concentration = 40.23 min.
Rainfall intensity = 1.237(In/Hr)
Area averaged loss rate (Fm) = 0.5095(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9701

++
Process from Point/Station 202.000 to Point/Station 202.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 1.306(In/Hr) for a 10.0 year storm
User specified values are as follows:
TC = 37.22 min. Rain intensity = 1.31(In/Hr)
Total area this stream = 146.77(Ac.)
Total Study Area (Main Stream No. 1) = 554.31(Ac.)
Total runoff = 84.59(CFS)

++
Process from Point/Station 202.000 to Point/Station 250.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2504.000(Ft.)
Downstream point elevation = 2495.000(Ft.)
Channel length thru subarea = 569.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 94.213(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 5.000(Ft.)
Flow(q) thru subarea = 94.213(CFS)
Depth of flow = 1.115(Ft.), Average velocity = 5.425(Ft/s)
Channel flow top width = 21.150(Ft.)
Flow Velocity = 5.42(Ft/s)
Travel time = 1.75 min.
Time of concentration = 38.97 min.
Critical depth = 1.148(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
Rainfall intensity = 1.265(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.544
Subarea runoff = 19.316(CFS) for 4.150(Ac.)
Total runoff = 103.906(CFS)
Effective area this stream = 150.92(Ac.)
Total Study Area (Main Stream No. 1) = 558.46(Ac.)
Area averaged Fm value = 0.500(In/Hr)
Depth of flow = 1.174(Ft.), Average velocity = 5.580(Ft/s)
Critical depth = 1.219(Ft.)

++
Process from Point/Station 250.000 to Point/Station 251.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2495.000(Ft.)
Downstream point elevation = 2485.000(Ft.)
Channel length thru subarea = 770.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 103.954(CFS)

Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 103.954(CFS)
Depth of flow = 1.236(Ft.), Average velocity = 5.201(Ft/s)
Channel flow top width = 22.355(Ft.)
Flow Velocity = 5.20(Ft/s)
Travel time = 2.47 min.
Time of concentration = 41.44 min.
Critical depth = 1.219(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 99.223(CFS)
therefore the upstream flow rate of Q = 103.906(CFS) is being used
Rainfall intensity = 1.212(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.527
Subarea runoff = 0.000(CFS) for 4.540(Ac.)
Total runoff = 103.906(CFS)
Effective area this stream = 155.46(Ac.)
Total Study Area (Main Stream No. 1) = 563.00(Ac.)
Area averaged Fm value = 0.502(In/Hr)
Depth of flow = 1.235(Ft.), Average velocity = 5.200(Ft/s)
Critical depth = 1.219(Ft.)

++
Process from Point/Station 251.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2485.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 1024.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 103.955(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 103.955(CFS)
Depth of flow = 1.142(Ft.), Average velocity = 5.795(Ft/s)
Channel flow top width = 21.420(Ft.)
Flow Velocity = 5.79(Ft/s)
Travel time = 2.95 min.
Time of concentration = 44.38 min.
Critical depth = 1.219(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 96.114(CFS)
therefore the upstream flow rate of Q = 103.906(CFS) is being used
Rainfall intensity = 1.155(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.505
Subarea runoff = 0.000(CFS) for 9.520(Ac.)
Total runoff = 103.906(CFS)
Effective area this stream = 164.98(Ac.)
Total Study Area (Main Stream No. 1) = 572.52(Ac.)

Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 1.142(Ft.), Average velocity = 5.794(Ft/s)
Critical depth = 1.219(Ft.)

++
Process from Point/Station 202.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 164.980(Ac.)
Runoff from this stream = 103.906(CFS)
Time of concentration = 44.38 min.
Rainfall intensity = 1.155(In/Hr)
Area averaged loss rate (Fm) = 0.5074(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9712
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	312.47	407.016	40.23	0.509	1.237
2	103.91	164.980	44.38	0.507	1.155

Qmax(1) =
1.000 * 1.000 * 312.475) +
1.127 * 0.906 * 103.906) + = 418.619
Qmax(2) =
0.887 * 1.000 * 312.475) +
1.000 * 1.000 * 103.906) + = 381.071

Total of 2 streams to confluence:
Flow rates before confluence point:
312.475 103.906
Maximum flow rates at confluence using above data:
418.619 381.071
Area of streams before confluence:
407.016 164.980
Effective area values after confluence:
556.558 571.996
Results of confluence:
Total flow rate = 418.619(CFS)
Time of concentration = 40.228 min.
Effective stream area after confluence = 556.558(Ac.)
Study area average Pervious fraction(Ap) = 0.970
Study area average soil loss rate(Fm) = 0.509(In/Hr)
Study area total (this main stream) = 572.00(Ac.)
End of computations, Total Study Area = 572.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.970
Area averaged SCS curve number = 85.1

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/19/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.295 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 100.000 to Point/Station 102.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 2.058(In/Hr) for a 25.0 year storm
User specified values are as follows:
TC = 30.96 min. Rain intensity = 2.06(In/Hr)
Total area this stream = 299.70(Ac.)
Total Study Area (Main Stream No. 1) = 299.70(Ac.)
Total runoff = 350.55(CFS)

++
Process from Point/Station 102.000 to Point/Station 150.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2509.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 899.000(Ft.)
Channel base width = 5.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 387.681(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 19.630(Ft.)
Flow(q) thru subarea = 387.681(CFS)
Depth of flow = 2.525(Ft.), Average velocity = 8.714(Ft/s)
Channel flow top width = 30.245(Ft.)
Flow Velocity = 8.71(Ft/s)
Travel time = 1.72 min.
Time of concentration = 32.68 min.
Critical depth = 2.813(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00

Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9100 Max loss rate(Fm)= 0.596(In/Hr)
Rainfall intensity = 1.982(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.671
Subarea runoff = 74.316(CFS) for 19.630(Ac.)
Total runoff = 424.866(CFS)
Effective area this stream = 319.33(Ac.)
Total Study Area (Main Stream No. 1) = 319.33(Ac.)
Area averaged Fm value = 0.503(In/Hr)
Depth of flow = 2.627(Ft.), Average velocity = 8.920(Ft/s)
Critical depth = 2.938(Ft.)

++
Process from Point/Station 102.000 to Point/Station 150.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 319.330(Ac.)
Runoff from this stream = 424.866(CFS)
Time of concentration = 32.68 min.
Rainfall intensity = 1.982(In/Hr)
Area averaged loss rate (Fm) = 0.5033(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9757

++
Process from Point/Station 120.000 to Point/Station 122.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 2.137(In/Hr) for a 25.0 year storm
User specified values are as follows:
TC = 29.33 min. Rain intensity = 2.14(In/Hr)
Total area this stream = 55.23(Ac.)
Total Study Area (Main Stream No. 1) = 374.56(Ac.)
Total runoff = 77.74(CFS)

++
Process from Point/Station 122.000 to Point/Station 150.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2501.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 615.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 77.857(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 77.857(CFS)
Depth of flow = 1.474(Ft.), Average velocity = 3.041(Ft/s)
Channel flow top width = 24.738(Ft.)
Flow Velocity = 3.04(Ft/s)
Travel time = 3.37 min.
Time of concentration = 32.70 min.
Critical depth = 1.031(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user

USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
Rainfall intensity = 1.981(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.672
Subarea runoff = 0.158(CFS) for 3.320(Ac.)
Total runoff = 77.898(CFS)
Effective area this stream = 58.55(Ac.)
Total Study Area (Main Stream No. 1) = 377.88(Ac.)
Area averaged Fm value = 0.502(In/Hr)
Depth of flow = 1.474(Ft.), Average velocity = 3.042(Ft/s)
Critical depth = 1.031(Ft.)

++
Process from Point/Station 122.000 to Point/Station 150.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 58.550(Ac.)
Runoff from this stream = 77.898(CFS)
Time of concentration = 32.70 min.
Rainfall intensity = 1.981(In/Hr)
Area averaged loss rate (Fm) = 0.5025(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9755
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	424.87	319.330	32.68	0.503	1.982
2	77.90	58.550	32.70	0.502	1.981

Qmax(1) =
1.000 * 1.000 * 424.866) +
1.001 * 0.999 * 77.898) + = 502.761
Qmax(2) =
0.999 * 1.000 * 424.866) +
1.000 * 1.000 * 77.898) + = 502.510

Total of 2 streams to confluence:
Flow rates before confluence point:
424.866 77.898
Maximum flow rates at confluence using above data:
502.761 502.510
Area of streams before confluence:
319.330 58.550
Effective area values after confluence:
377.843 377.880
Results of confluence:
Total flow rate = 502.761(CFS)
Time of concentration = 32.679 min.
Effective stream area after confluence = 377.843(Ac.)
Study area average Pervious fraction(Ap) = 0.976
Study area average soil loss rate(Fm) = 0.503(In/Hr)
Study area total (this main stream) = 377.88(Ac.)

++
Process from Point/Station 150.000 to Point/Station 151.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2483.000(Ft.)

Channel length thru subarea = 670.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 502.802(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 502.802(CFS)
Depth of flow = 3.565(Ft.), Average velocity = 5.152(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 40.000(Ft.)
Flow Velocity = 5.15(Ft/s)
Travel time = 2.17 min.
Time of concentration = 34.85 min.
Critical depth = 2.781(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 491.949(CFS)
therefore the upstream flow rate of Q = 502.761(CFS) is being used
Rainfall intensity = 1.895(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.659
Subarea runoff = 0.000(CFS) for 16.010(Ac.)
Total runoff = 502.761(CFS)
Effective area this stream = 393.85(Ac.)
Total Study Area (Main Stream No. 1) = 393.89(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 3.565(Ft.), Average velocity = 5.151(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 2.781(Ft.)

++
Process from Point/Station 151.000 to Point/Station 152.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2483.000(Ft.)
Downstream point elevation = 2479.000(Ft.)
Channel length thru subarea = 673.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 502.786(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 502.786(CFS)
Depth of flow = 3.181(Ft.), Average velocity = 6.114(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 40.000(Ft.)
Flow Velocity = 6.11(Ft/s)
Travel time = 1.83 min.
Time of concentration = 36.68 min.
Critical depth = 2.781(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80

Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 479.685(CFS)
therefore the upstream flow rate of Q = 502.761(CFS) is being used
Rainfall intensity = 1.828(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.649
Subarea runoff = 0.000(CFS) for 10.250(Ac.)
Total runoff = 502.761(CFS)
Effective area this stream = 404.10(Ac.)
Total Study Area (Main Stream No. 1) = 404.14(Ac.)
Area averaged Fm value = 0.509(In/Hr)
Depth of flow = 3.181(Ft.), Average velocity = 6.114(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 2.781(Ft.)

++
Process from Point/Station 152.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2479.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 644.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 502.794(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 502.794(CFS)
Depth of flow = 3.337(Ft.), Average velocity = 5.683(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 40.000(Ft.)
Flow Velocity = 5.68(Ft/s)
Travel time = 1.89 min.
Time of concentration = 38.57 min.
Critical depth = 2.781(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 460.326(CFS)
therefore the upstream flow rate of Q = 502.761(CFS) is being used
Rainfall intensity = 1.765(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.640
Subarea runoff = 0.000(CFS) for 3.400(Ac.)
Total runoff = 502.761(CFS)
Effective area this stream = 407.50(Ac.)
Total Study Area (Main Stream No. 1) = 407.54(Ac.)
Area averaged Fm value = 0.509(In/Hr)
Depth of flow = 3.337(Ft.), Average velocity = 5.683(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 2.781(Ft.)

++
Process from Point/Station 102.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****

```
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    407.503(Ac.)
Runoff from this stream =    502.761(CFS)
Time of concentration =   38.57 min.
Rainfall intensity =     1.765(In/Hr)
Area averaged loss rate (Fm) =    0.5094(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9702


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800     Max loss rate(Fm)=     0.497(In/Hr)
Rainfall intensity =      1.809(In/Hr) for a    25.0 year storm
User specified values are as follows:
TC =  37.22 min.  Rain intensity =       1.81(In/Hr)
Total area this stream =       146.77(Ac.)
Total Study Area (Main Stream No. 1) =      554.31(Ac.)
Total runoff =    159.32(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      250.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation =  2504.000(Ft.)
Downstream point elevation =  2495.000(Ft.)
Channel length thru subarea  =   569.000(Ft.)
Channel base width     =   10.000(Ft.)
Slope or 'Z' of left channel bank =   5.000
Slope or 'Z' of right channel bank =   5.000
Estimated mean flow rate at midpoint of channel =    165.221(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    5.000(Ft.)
Flow(q) thru subarea =    165.221(CFS)
Depth of flow =   1.489(Ft.), Average velocity =   6.360(Ft/s)
Channel flow top width =   24.891(Ft.)
Flow Velocity =    6.36(Ft/s)
Travel time  =    1.49 min.
Time of concentration =   38.71 min.
Critical depth =      1.563(Ft.)
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.589(In/Hr)
Rainfall intensity =      1.760(In/Hr) for a    25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.644
Subarea runoff =     11.861(CFS) for    4.150(Ac.)
Total runoff =    171.181(CFS)
Effective area this stream =      150.92(Ac.)
Total Study Area (Main Stream No. 1) =      558.46(Ac.)
Area averaged Fm value =    0.500(In/Hr)
Depth of flow =   1.516(Ft.), Average velocity =   6.423(Ft/s)
Critical depth =      1.594(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

Process from Point/Station 250.000 to Point/Station 251.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2495.000(Ft.)
Downstream point elevation = 2485.000(Ft.)
Channel length thru subarea = 770.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 171.221(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 171.221(CFS)
Depth of flow = 1.593(Ft.), Average velocity = 5.981(Ft/s)
Channel flow top width = 25.934(Ft.)
Flow Velocity = 5.98(Ft/s)
Travel time = 2.15 min.
Time of concentration = 40.86 min.
Critical depth = 1.594(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 166.840(CFS)
therefore the upstream flow rate of Q = 171.181(CFS) is being used
Rainfall intensity = 1.695(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.633
Subarea runoff = 0.000(CFS) for 4.540(Ac.)
Total runoff = 171.181(CFS)
Effective area this stream = 155.46(Ac.)
Total Study Area (Main Stream No. 1) = 563.00(Ac.)
Area averaged Fm value = 0.502(In/Hr)
Depth of flow = 1.593(Ft.), Average velocity = 5.981(Ft/s)
Critical depth = 1.594(Ft.)

++
Process from Point/Station 251.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2485.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 1024.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 171.222(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 171.222(CFS)
Depth of flow = 1.476(Ft.), Average velocity = 6.673(Ft/s)
Channel flow top width = 24.763(Ft.)
Flow Velocity = 6.67(Ft/s)
Travel time = 2.56 min.
Time of concentration = 43.41 min.
Critical depth = 1.594(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)

The area added to the existing stream causes a
a lower flow rate of Q = 165.842(CFS)
therefore the upstream flow rate of Q = 171.181(CFS) is being used
Rainfall intensity = 1.624(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.619
Subarea runoff = 0.000(CFS) for 9.520(Ac.)
Total runoff = 171.181(CFS)
Effective area this stream = 164.98(Ac.)
Total Study Area (Main Stream No. 1) = 572.52(Ac.)
Area averaged Fm value = 0.507(In/Hr)
Depth of flow = 1.476(Ft.), Average velocity = 6.672(Ft/s)
Critical depth = 1.594(Ft.)

++
Process from Point/Station 202.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 164.980(Ac.)
Runoff from this stream = 171.181(CFS)
Time of concentration = 43.41 min.
Rainfall intensity = 1.624(In/Hr)
Area averaged loss rate (Fm) = 0.5074(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9712
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	502.76	407.503	38.57	0.509	1.765
2	171.18	164.980	43.41	0.507	1.624

Qmax(1) =
1.000 * 1.000 * 502.761) +
1.126 * 0.888 * 171.181) + = 673.938
Qmax(2) =
0.888 * 1.000 * 502.761) +
1.000 * 1.000 * 171.181) + = 617.761

Total of 2 streams to confluence:
Flow rates before confluence point:
502.761 171.181
Maximum flow rates at confluence using above data:
673.938 617.761
Area of streams before confluence:
407.503 164.980
Effective area values after confluence:
554.074 572.483
Results of confluence:
Total flow rate = 673.938(CFS)
Time of concentration = 38.570 min.
Effective stream area after confluence = 554.074(Ac.)
Study area average Pervious fraction(Ap) = 0.970
Study area average soil loss rate(Fm) = 0.509(In/Hr)
Study area total (this main stream) = 572.48(Ac.)
End of computations, Total Study Area = 572.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.970
Area averaged SCS curve number = 85.1

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/19/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.840 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 100.000 to Point/Station 102.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 2.924(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 30.96 min. Rain intensity = 2.92(In/Hr)
Total area this stream = 299.70(Ac.)
Total Study Area (Main Stream No. 1) = 299.70(Ac.)
Total runoff = 583.85(CFS)

++
Process from Point/Station 102.000 to Point/Station 150.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2509.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 899.000(Ft.)
Channel base width = 5.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 625.824(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 19.630(Ft.)
Flow(q) thru subarea = 625.824(CFS)
Depth of flow = 3.101(Ft.), Average velocity = 9.840(Ft/s)
Channel flow top width = 36.014(Ft.)
Flow Velocity = 9.84(Ft/s)
Travel time = 1.52 min.
Time of concentration = 32.48 min.
Critical depth = 3.500(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00

Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9100 Max loss rate(Fm)= 0.596(In/Hr)
Rainfall intensity = 2.827(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.740
Subarea runoff = 84.042(CFS) for 19.630(Ac.)
Total runoff = 667.892(CFS)
Effective area this stream = 319.33(Ac.)
Total Study Area (Main Stream No. 1) = 319.33(Ac.)
Area averaged Fm value = 0.503(In/Hr)
Depth of flow = 3.188(Ft.), Average velocity = 10.003(Ft/s)
Critical depth = 3.594(Ft.)

++
Process from Point/Station 102.000 to Point/Station 150.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 319.330(Ac.)
Runoff from this stream = 667.892(CFS)
Time of concentration = 32.48 min.
Rainfall intensity = 2.827(In/Hr)
Area averaged loss rate (Fm) = 0.5033(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9757

++
Process from Point/Station 120.000 to Point/Station 122.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 3.037(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 29.33 min. Rain intensity = 3.04(In/Hr)
Total area this stream = 55.23(Ac.)
Total Study Area (Main Stream No. 1) = 374.56(Ac.)
Total runoff = 126.65(CFS)

++
Process from Point/Station 122.000 to Point/Station 150.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2501.000(Ft.)
Downstream point elevation = 2492.000(Ft.)
Channel length thru subarea = 615.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 126.680(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 126.680(CFS)
Depth of flow = 1.879(Ft.), Average velocity = 3.476(Ft/s)
Channel flow top width = 28.790(Ft.)
Flow Velocity = 3.48(Ft/s)
Travel time = 2.95 min.
Time of concentration = 32.28 min.
Critical depth = 1.359(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user

USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 123.162(CFS)
therefore the upstream flow rate of Q = 126.650(CFS) is being used
Rainfall intensity = 2.840(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.741
Subarea runoff = 0.000(CFS) for 3.320(Ac.)
Total runoff = 126.650(CFS)
Effective area this stream = 58.55(Ac.)
Total Study Area (Main Stream No. 1) = 377.88(Ac.)
Area averaged Fm value = 0.502(In/Hr)
Depth of flow = 1.879(Ft.), Average velocity = 3.476(Ft/s)
Critical depth = 1.359(Ft.)

++
Process from Point/Station 122.000 to Point/Station 150.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 2
Stream flow area = 58.550(Ac.)
Runoff from this stream = 126.650(CFS)
Time of concentration = 32.28 min.
Rainfall intensity = 2.840(In/Hr)
Area averaged loss rate (Fm) = 0.5025(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9755
Summary of stream data:

Stream No.	Flow rate (CFS)	Area (Ac.)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	667.89	319.330	32.48	0.503	2.827
2	126.65	58.550	32.28	0.502	2.840

Qmax(1) =
1.000 * 1.000 * 667.892) +
0.995 * 1.000 * 126.650) + = 793.865
Qmax(2) =
1.005 * 0.994 * 667.892) +
1.000 * 1.000 * 126.650) + = 793.917

Total of 2 streams to confluence:
Flow rates before confluence point:
667.892 126.650
Maximum flow rates at confluence using above data:
793.865 793.917
Area of streams before confluence:
319.330 58.550
Effective area values after confluence:
377.880 375.875
Results of confluence:
Total flow rate = 793.917(CFS)
Time of concentration = 32.279 min.
Effective stream area after confluence = 375.875(Ac.)
Study area average Pervious fraction(Ap) = 0.976
Study area average soil loss rate(Fm) = 0.503(In/Hr)
Study area total (this main stream) = 377.88(Ac.)

++
Process from Point/Station 150.000 to Point/Station 151.000
**** IMPROVED CHANNEL TRAVEL TIME ****

```
_____
Upstream point elevation =  2492.000(Ft.)
Downstream point elevation =  2483.000(Ft.)
Channel length thru subarea  =  670.000(Ft.)
Channel base width    =  10.000(Ft.)
Slope or 'Z' of left channel bank =  5.000
Slope or 'Z' of right channel bank =  5.000
Estimated mean flow rate at midpoint of channel =   793.950(CFS)
Manning's 'N'   = 0.060
Maximum depth of channel  =  3.000(Ft.)
Flow(q) thru subarea =   793.950(CFS)
Depth of flow =  4.334(Ft.), Average velocity =  6.184(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =  40.000(Ft.)
Flow Velocity =   6.18(Ft/s)
Travel time  =   1.81 min.
Time of concentration =  34.08 min.
Critical depth =    3.438(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000    Max loss rate(Fm)=    0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =   785.417(CFS)
therefore the upstream flow rate of Q =   793.917(CFS) is being used
Rainfall intensity =    2.734(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.733
Subarea runoff =    0.000(CFS) for   16.010(Ac.)
Total runoff =   793.917(CFS)
Effective area this stream =    391.89(Ac.)
Total Study Area (Main Stream No. 1) =    393.89(Ac.)
Area averaged Fm value =   0.507(In/Hr)
Depth of flow =  4.334(Ft.), Average velocity =  6.184(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth =    3.438(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     151.000 to Point/Station     152.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation =  2483.000(Ft.)
Downstream point elevation =  2479.000(Ft.)
Channel length thru subarea  =  673.000(Ft.)
Channel base width    =  10.000(Ft.)
Slope or 'Z' of left channel bank =  5.000
Slope or 'Z' of right channel bank =  5.000
Estimated mean flow rate at midpoint of channel =   793.957(CFS)
Manning's 'N'   = 0.060
Maximum depth of channel  =  3.000(Ft.)
Flow(q) thru subarea =   793.957(CFS)
Depth of flow =  5.224(Ft.), Average velocity =  4.842(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width =  40.000(Ft.)
Flow Velocity =   4.84(Ft/s)
Travel time  =   2.32 min.
Time of concentration =  36.40 min.
Critical depth =    3.438(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
 Adding area flow to channel
Soil classification AP and SCS  values input by user
```

USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 760.700(CFS)
therefore the upstream flow rate of Q = 793.917(CFS) is being used
Rainfall intensity = 2.611(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.725
Subarea runoff = 0.000(CFS) for 10.250(Ac.)
Total runoff = 793.917(CFS)
Effective area this stream = 402.14(Ac.)
Total Study Area (Main Stream No. 1) = 404.14(Ac.)
Area averaged Fm value = 0.509(In/Hr)
Depth of flow = 5.224(Ft.), Average velocity = 4.842(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 3.438(Ft.)

++
Process from Point/Station 152.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2479.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 644.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 793.943(CFS)
Manning's 'N' = 0.060
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 793.943(CFS)
Depth of flow = 4.034(Ft.), Average velocity = 6.822(Ft/s)
!!Warning: Water is above left or right bank elevations
Channel flow top width = 40.000(Ft.)
Flow Velocity = 6.82(Ft/s)
Travel time = 1.57 min.
Time of concentration = 37.97 min.
Critical depth = 3.438(Ft.)
ERROR- Channel depth exceeds maximum allowable depth
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 739.078(CFS)
therefore the upstream flow rate of Q = 793.917(CFS) is being used
Rainfall intensity = 2.534(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.719
Subarea runoff = 0.000(CFS) for 3.400(Ac.)
Total runoff = 793.917(CFS)
Effective area this stream = 405.54(Ac.)
Total Study Area (Main Stream No. 1) = 407.54(Ac.)
Area averaged Fm value = 0.509(In/Hr)
Depth of flow = 4.034(Ft.), Average velocity = 6.822(Ft/s)
!!Warning: Water is above left or right bank elevations
ERROR- Channel depth exceeds maximum allowable depth
Critical depth = 3.438(Ft.)

++
Process from Point/Station 102.000 to Point/Station 400.000
**** CONFLUENCE OF MINOR STREAMS ****
_____
Along Main Stream number: 1 in normal stream number 1
Stream flow area = 405.535(Ac.)
Runoff from this stream = 793.917(CFS)
Time of concentration = 37.97 min.
Rainfall intensity = 2.534(In/Hr)
Area averaged loss rate (Fm) = 0.5095(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9701

++
Process from Point/Station 202.000 to Point/Station 202.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 0.9800 Max loss rate(Fm)= 0.497(In/Hr)
Rainfall intensity = 2.570(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 37.22 min. Rain intensity = 2.57(In/Hr)
Total area this stream = 146.77(Ac.)
Total Study Area (Main Stream No. 1) = 554.31(Ac.)
Total runoff = 273.80(CFS)

++
Process from Point/Station 202.000 to Point/Station 250.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2504.000(Ft.)
Downstream point elevation = 2495.000(Ft.)
Channel length thru subarea = 569.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 273.830(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 5.000(Ft.)
Flow(q) thru subarea = 273.830(CFS)
Depth of flow = 1.915(Ft.), Average velocity = 7.304(Ft/s)
Channel flow top width = 29.151(Ft.)
Flow Velocity = 7.30(Ft/s)
Travel time = 1.30 min.
Time of concentration = 38.52 min.
Critical depth = 2.047(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 272.947(CFS)
therefore the upstream flow rate of Q = 273.800(CFS) is being used
Rainfall intensity = 2.509(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.721
Subarea runoff = 0.000(CFS) for 4.150(Ac.)
Total runoff = 273.800(CFS)
Effective area this stream = 150.92(Ac.)
Total Study Area (Main Stream No. 1) = 558.46(Ac.)

Area averaged Fm value = 0.500(In/Hr)
Depth of flow = 1.915(Ft.), Average velocity = 7.304(Ft/s)
Critical depth = 2.047(Ft.)

++
Process from Point/Station 250.000 to Point/Station 251.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2495.000(Ft.)
Downstream point elevation = 2485.000(Ft.)
Channel length thru subarea = 770.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 273.832(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 273.832(CFS)
Depth of flow = 2.010(Ft.), Average velocity = 6.797(Ft/s)
Channel flow top width = 30.096(Ft.)
Flow Velocity = 6.80(Ft/s)
Travel time = 1.89 min.
Time of concentration = 40.41 min.
Critical depth = 2.047(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000 Max loss rate(Fm)= 0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q = 269.227(CFS)
therefore the upstream flow rate of Q = 273.800(CFS) is being used
Rainfall intensity = 2.427(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.714
Subarea runoff = 0.000(CFS) for 4.540(Ac.)
Total runoff = 273.800(CFS)
Effective area this stream = 155.46(Ac.)
Total Study Area (Main Stream No. 1) = 563.00(Ac.)
Area averaged Fm value = 0.502(In/Hr)
Depth of flow = 2.010(Ft.), Average velocity = 6.796(Ft/s)
Critical depth = 2.047(Ft.)

++
Process from Point/Station 251.000 to Point/Station 400.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2485.000(Ft.)
Downstream point elevation = 2467.000(Ft.)
Channel length thru subarea = 1024.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 273.833(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 273.833(CFS)
Depth of flow = 1.866(Ft.), Average velocity = 7.591(Ft/s)
Channel flow top width = 28.662(Ft.)
Flow Velocity = 7.59(Ft/s)
Travel time = 2.25 min.
Time of concentration = 42.65 min.
Critical depth = 2.047(Ft.)

```
 Adding area flow to channel
Soil classification AP and SCS  values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2)  = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9000     Max loss rate(Fm)=     0.589(In/Hr)
The area added to the existing stream causes a
a lower flow rate of Q =    271.569(CFS)
therefore the upstream flow rate of Q =    273.800(CFS) is being used
Rainfall intensity =      2.336(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.705
Subarea runoff =      0.000(CFS) for    9.520(Ac.)
Total runoff =    273.800(CFS)
Effective area this stream =      164.98(Ac.)
Total Study Area (Main Stream No. 1) =      572.52(Ac.)
Area averaged Fm value =    0.507(In/Hr)
Depth of flow =   1.866(Ft.), Average velocity =   7.590(Ft/s)
Critical depth =      2.047(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      400.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =    164.980(Ac.)
Runoff from this stream =    273.800(CFS)
Time of concentration =   42.65 min.
Rainfall intensity =     2.336(In/Hr)
Area averaged loss rate (Fm) =    0.5074(In/Hr)
Area averaged Pervious ratio (Ap) = 0.9712
Summary of stream data:

Stream Flow rate    Area    TC     Fm       Rainfall Intensity
 No.    (CFS)   (Ac.)      (min) (In/Hr)     (In/Hr)


1    793.92   405.535     37.97    0.509      2.534
2    273.80   164.980     42.65    0.507      2.336
Qmax(1) =
                1.000 *    1.000 *   793.917) +
                1.108 *    0.890 *   273.800) + =    1064.066
Qmax(2) =
                0.902 *    1.000 *   793.917) +
                1.000 *    1.000 *   273.800) + =     990.064

Total of 2 streams to confluence:
Flow rates before confluence point:
    793.917     273.800
Maximum flow rates at confluence using above data:
    1064.066      990.064
Area of streams before confluence:
     405.535      164.980
Effective area values after confluence:
     552.410      570.515
Results of confluence:
Total flow rate =   1064.066(CFS)
Time of concentration =    37.974 min.
Effective stream area after confluence =     552.410(Ac.)
Study area average Pervious fraction(Ap) =  0.970
Study area average soil loss rate(Fm) =    0.509(In/Hr)
Study area total (this main stream) =     570.52(Ac.)
End of computations, Total Study Area =          572.52 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.970
Area averaged SCS curve number = 85.1

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/19/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 10.0
Computed rainfall intensity:
Storm year = 10.00 1 hour rainfall = 0.935 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 300.000 to Point/Station 302.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
_____
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 1.893(In/Hr) for a 10.0 year storm
User specified values are as follows:
TC = 21.91 min. Rain intensity = 1.89(In/Hr)
Total area this stream = 25.92(Ac.)
Total Study Area (Main Stream No. 1) = 25.92(Ac.)
Total runoff = 30.64(CFS)

++
Process from Point/Station 302.000 to Point/Station 350.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2486.000(Ft.)
Channel length thru subarea = 325.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 34.910(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 34.910(CFS)
Depth of flow = 0.626(Ft.), Average velocity = 4.249(Ft/s)
Channel flow top width = 16.258(Ft.)
Flow Velocity = 4.25(Ft/s)
Travel time = 1.27 min.
Time of concentration = 23.18 min.
Critical depth = 0.648(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9500 Max loss rate(Fm)= 0.622(In/Hr)

Rainfall intensity = 1.819(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.636
Subarea runoff = 8.485(CFS) for 7.910(Ac.)
Total runoff = 39.125(CFS)
Effective area this stream = 33.83(Ac.)
Total Study Area (Main Stream No. 1) = 33.83(Ac.)
Area averaged Fm value = 0.534(In/Hr)
Depth of flow = 0.667(Ft.), Average velocity = 4.403(Ft/s)
Critical depth = 0.688(Ft.)

++
Process from Point/Station 350.000 to Point/Station 303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2486.000(Ft.)
Downstream point elevation = 2475.000(Ft.)
Channel length thru subarea = 893.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 43.152(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 43.152(CFS)
Depth of flow = 0.786(Ft.), Average velocity = 3.943(Ft/s)
Channel flow top width = 17.857(Ft.)
Flow Velocity = 3.94(Ft/s)
Travel time = 3.77 min.
Time of concentration = 26.96 min.
Critical depth = 0.734(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9500 Max loss rate(Fm)= 0.622(In/Hr)
Rainfall intensity = 1.637(In/Hr) for a 10.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method)(Q=KCIA) is C = 0.592
Subarea runoff = 7.973(CFS) for 14.800(Ac.)
Total runoff = 47.098(CFS)
Effective area this stream = 48.63(Ac.)
Total Study Area (Main Stream No. 1) = 48.63(Ac.)
Area averaged Fm value = 0.561(In/Hr)
Depth of flow = 0.824(Ft.), Average velocity = 4.049(Ft/s)
Critical depth = 0.773(Ft.)
End of computations, Total Study Area = 48.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.977
Area averaged SCS curve number = 82.7

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/19/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 25.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 25.00 1 hour rainfall = 1.295 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 300.000 to Point/Station 302.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 2.622(In/Hr) for a 25.0 year storm
User specified values are as follows:
TC = 21.91 min. Rain intensity = 2.62(In/Hr)
Total area this stream = 25.92(Ac.)
Total Study Area (Main Stream No. 1) = 25.92(Ac.)
Total runoff = 48.24(CFS)

++
Process from Point/Station 302.000 to Point/Station 350.000
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2486.000(Ft.)
Channel length thru subarea = 325.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 54.574(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 54.574(CFS)
Depth of flow = 0.800(Ft.), Average velocity = 4.875(Ft/s)
Channel flow top width = 17.996(Ft.)
Flow Velocity = 4.88(Ft/s)
Travel time = 1.11 min.
Time of concentration = 23.02 min.
Critical depth = 0.844(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00

Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9500 Max loss rate(Fm)= 0.622(In/Hr)
Rainfall intensity = 2.532(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.710
Subarea runoff = 12.601(CFS) for 7.910(Ac.)
Total runoff = 60.841(CFS)
Effective area this stream = 33.83(Ac.)
Total Study Area (Main Stream No. 1) = 33.83(Ac.)
Area averaged Fm value = 0.534(In/Hr)
Depth of flow = 0.848(Ft.), Average velocity = 5.038(Ft/s)
Critical depth = 0.891(Ft.)

++
Process from Point/Station 350.000 to Point/Station 303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2486.000(Ft.)
Downstream point elevation = 2475.000(Ft.)
Channel length thru subarea = 893.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 68.672(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 68.672(CFS)
Depth of flow = 1.008(Ft.), Average velocity = 4.529(Ft/s)
Channel flow top width = 20.082(Ft.)
Flow Velocity = 4.53(Ft/s)
Travel time = 3.29 min.
Time of concentration = 26.31 min.
Critical depth = 0.961(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9500 Max loss rate(Fm)= 0.622(In/Hr)
Rainfall intensity = 2.307(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.681
Subarea runoff = 15.566(CFS) for 14.800(Ac.)
Total runoff = 76.407(CFS)
Effective area this stream = 48.63(Ac.)
Total Study Area (Main Stream No. 1) = 48.63(Ac.)
Area averaged Fm value = 0.561(In/Hr)
Depth of flow = 1.067(Ft.), Average velocity = 4.672(Ft/s)
Critical depth = 1.016(Ft.)
End of computations, Total Study Area = 48.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.977
Area averaged SCS curve number = 82.7

San Bernardino County Rational Hydrology Program

(Hydrology Manual Date- August 1986)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2005 Version 7.1
Rational Hydrology Study Date: 11/19/24

Program License Serial Number 5006

********* Hydrology Study Control Information **********

Rational hydrology study storm event year is 100.0
10 Year storm 1 hour rainfall = 0.935(In.)
100 Year storm 1 hour rainfall = 1.840(In.)
Computed rainfall intensity:
Storm year = 100.00 1 hour rainfall = 1.840 (In.)
Slope used for rainfall intensity curve b = 0.7000
Soil antecedent moisture condition (AMC) = 1

++
Process from Point/Station 300.000 to Point/Station 302.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 86.00
Adjusted SCS curve number for AMC 1 = 71.60
Pervious ratio(Ap) = 1.0000 Max loss rate(Fm)= 0.507(In/Hr)
Rainfall intensity = 3.725(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 21.91 min. Rain intensity = 3.72(In/Hr)
Total area this stream = 25.92(Ac.)
Total Study Area (Main Stream No. 1) = 25.92(Ac.)
Total runoff = 75.05(CFS)

++
Process from Point/Station 302.000 to Point/Station 350.000
**** IMPROVED CHANNEL TRAVEL TIME ****

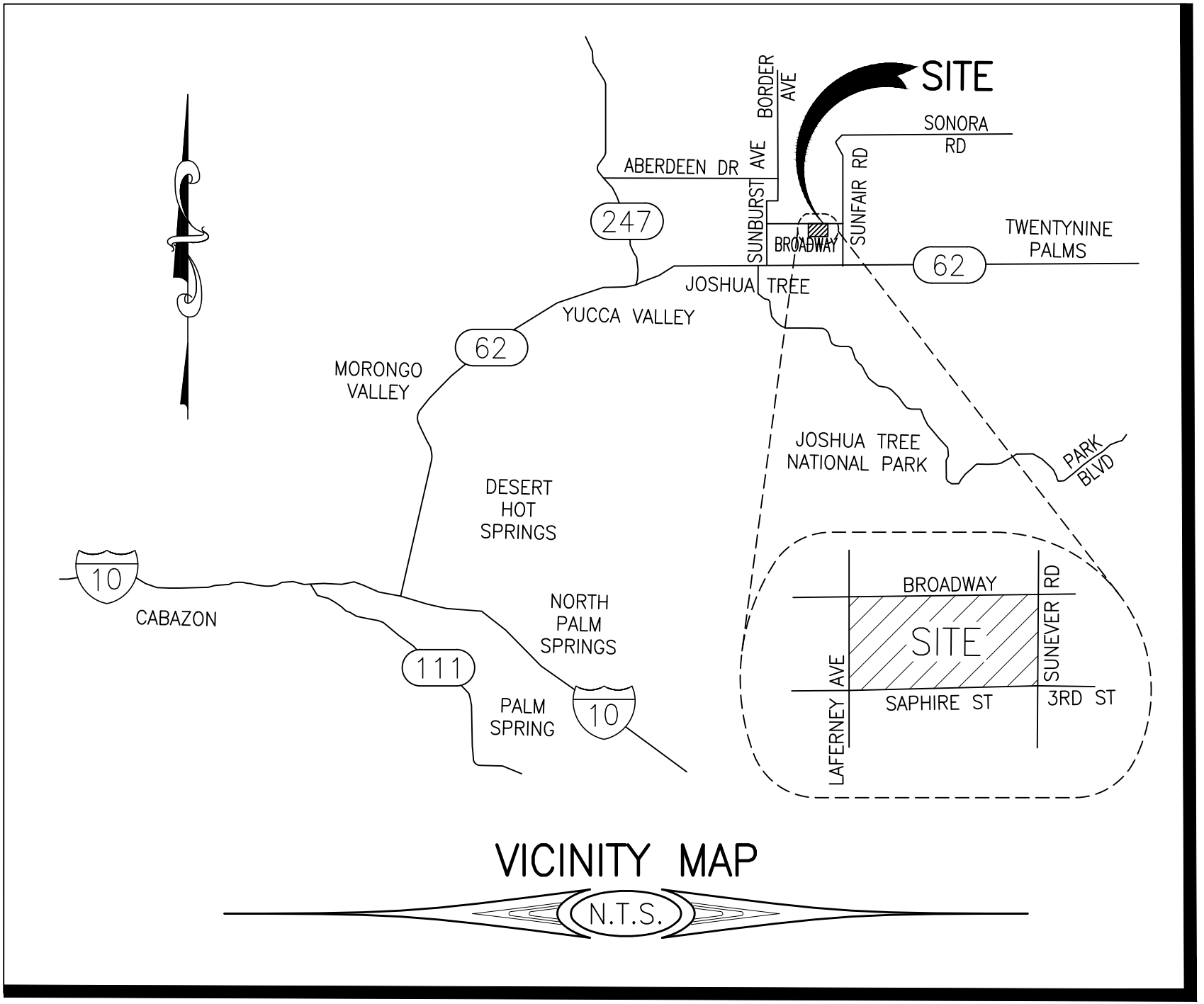
Upstream point elevation = 2492.000(Ft.)
Downstream point elevation = 2486.000(Ft.)
Channel length thru subarea = 325.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 84.424(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 84.424(CFS)
Depth of flow = 1.010(Ft.), Average velocity = 5.551(Ft/s)
Channel flow top width = 20.104(Ft.)
Flow Velocity = 5.55(Ft/s)
Travel time = 0.98 min.
Time of concentration = 22.89 min.
Critical depth = 1.078(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00

Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9500 Max loss rate(Fm)= 0.622(In/Hr)
Rainfall intensity = 3.613(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.767
Subarea runoff = 18.681(CFS) for 7.910(Ac.)
Total runoff = 93.731(CFS)
Effective area this stream = 33.83(Ac.)
Total Study Area (Main Stream No. 1) = 33.83(Ac.)
Area averaged Fm value = 0.534(In/Hr)
Depth of flow = 1.068(Ft.), Average velocity = 5.723(Ft/s)
Critical depth = 1.141(Ft.)

++
Process from Point/Station 350.000 to Point/Station 303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
_____
Upstream point elevation = 2486.000(Ft.)
Downstream point elevation = 2475.000(Ft.)
Channel length thru subarea = 893.000(Ft.)
Channel base width = 10.000(Ft.)
Slope or 'Z' of left channel bank = 5.000
Slope or 'Z' of right channel bank = 5.000
Estimated mean flow rate at midpoint of channel = 107.367(CFS)
Manning's 'N' = 0.030
Maximum depth of channel = 3.000(Ft.)
Flow(q) thru subarea = 107.367(CFS)
Depth of flow = 1.274(Ft.), Average velocity = 5.150(Ft/s)
Channel flow top width = 22.736(Ft.)
Flow Velocity = 5.15(Ft/s)
Travel time = 2.89 min.
Time of concentration = 25.78 min.
Critical depth = 1.234(Ft.)
Adding area flow to channel
Soil classification AP and SCS values input by user
USER INPUT of soil data for subarea
SCS curve number for soil(AMC 2) = 79.00
Adjusted SCS curve number for AMC 1 = 61.80
Pervious ratio(Ap) = 0.9500 Max loss rate(Fm)= 0.622(In/Hr)
Rainfall intensity = 3.324(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area,(total area with modified
rational method)(Q=KCIA) is C = 0.748
Subarea runoff = 27.212(CFS) for 14.800(Ac.)
Total runoff = 120.943(CFS)
Effective area this stream = 48.63(Ac.)
Total Study Area (Main Stream No. 1) = 48.63(Ac.)
Area averaged Fm value = 0.561(In/Hr)
Depth of flow = 1.354(Ft.), Average velocity = 5.327(Ft/s)
Critical depth = 1.320(Ft.)
End of computations, Total Study Area = 48.63 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.977
Area averaged SCS curve number = 82.7

Appendix E – Supporting Reference Data



VICINITY MAP

N.T.S.

JOSHUA TREE ESTATES

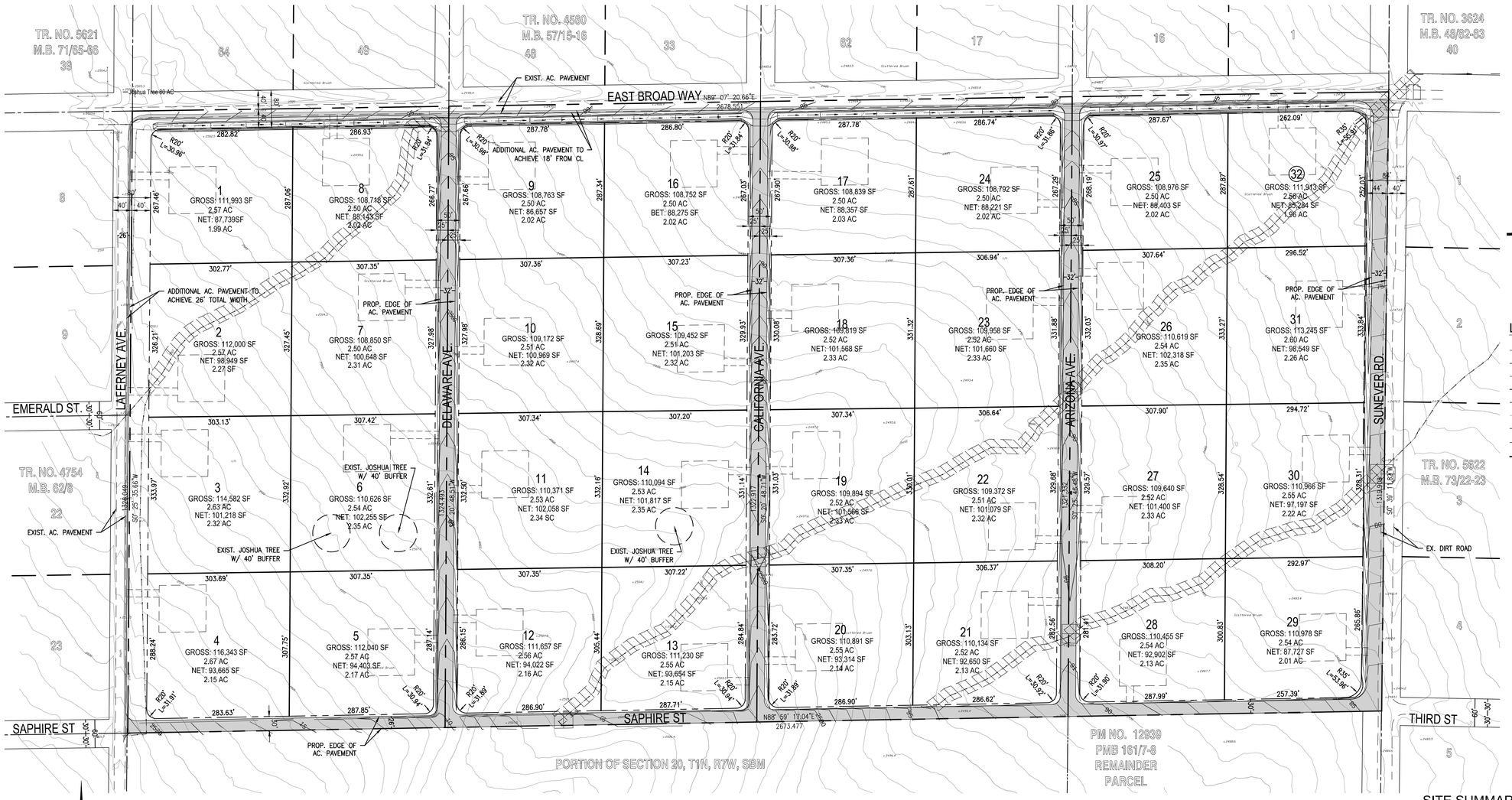
IN UNINCORPORATED TERRITORY OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

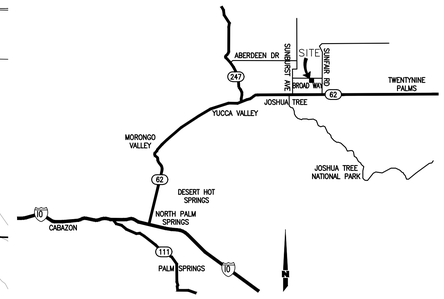
TENTATIVE TRAC.T No. 20668

BEING A PROPOSED SUBDIVISION OF THE NORTH ONE-HALF OF THE NORTHEAST ONE- QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA AC.CORDING TO THE OFFICIAL PLAT THEREOF.

JULY 2024

FOR OFFICIAL USE ONLY





VICINITY MAP

NOT TO SCALE

LEGEND

- PROJECT BOUNDARY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- STREET CENTERLINE
- 1640 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 1640 PROPOSED CONTOUR
- EXIST. FLOW LINE & DIRECTION
- PROPOSED SWALE
- 2:1 PROPOSED SLOPE W/SLOPE RATIO
- FLOW DIRECTION
- PROPOSED CHANNEL CROSSING
- 10,000 S.F. BLDG. ENVELOPE

MIN. 20' WIDE DRAINAGE EASEMENT. FINAL WIDTH TO BE DETERMINED AT TIME OF FINAL MAP & CONSTRUCTION DRAWINGS

ABBREVIATIONS

FS	FINISH SURFAC.E ELEVATION
PE	PAD ELEVATION
H.P.	HIGH POINT
L.P.	LOW POINT
H=2.5'	HEIGHT OF WALL OR D.F.
T/G	TOP OF GRATE INLET
T/S	TOP OF SLOPE
G.B.	GRADE BREAK
FL	FLOWLINE
TR	TRAC.T MAP
NO.	NUMBER
MB	MAP BOOK
PMB	PARCEL MAP BOOK
PM	PARCEL MAP
ST	STREET
BNDY	BOUNDARY
CL	CENTERLINE
HZ	HORIZONTAL
EX.	EXISTING
N'LY	NORTHERLY
S'LY	SOUTHERLY
E'LY	EASTERLY
W'LY	WESTERLY
AC.	ASPHALT CONCRETE
PROP.	PROPOSED

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBER: 0605-051-01

UTILITY PROVIDERS

ELECTRIC:
SOUTHERN CALIFORNIA EDISON COMPANY
P.O. BOX 11482
SANTA ANA, CA 92711
(714) 796-9920

WATER:
JOSHUA BASIN WATER DIST.
61750 CHOLITA RD.
JOSHUA TREE, CA 92252
(760) 336-8438

SEWER:
PRIVATE INDIVIDUAL SEPTIC

TELEPHONE:
AT&T
(800) 310-2355

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9191

TRASH SERVICES:
4878 NEWTON ROAD
YUCCA VALLEY, CA 92284
(760) 340-2113

GAS:
SOUTHERN CALIFORNIA GAS COMPANY
(800) 427-2200
DEVELOPER WILL USE PROPANE

SITE SUMMARY

SITE ACREAGE (GROSS):	81.2 AC..
R.O.W. TO BE DEDICATED:	-11.0 AC..
SITE ACREAGE (NET):	70.2 AC..
TOTAL NUMBER OF RESIDENTIAL LOTS:	32
LINEAR FEET OF NEW STREETS	6,642 LF

SITE INFORMATION

ASSESSOR'S PARCEL NUMBER: 0605-051-01

TRACT NUMBER: 20668

EXISTING ZONING: JT/RL (JOSHUA TREE/RURAL LIVING)

PROPOSED ZONING: NO CHANGE

EXISTING LAND USE: VACANT

PROPOSED LAND USE: SFR

PROJECT TYPE: DEVELOPER BUILD OUT

NOTE: ALL ADJACENT PARCELS ARE ZONED JT/RL

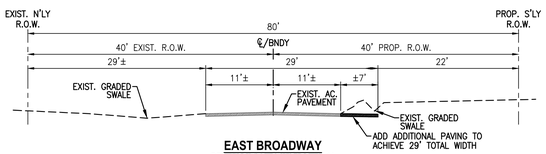
EARTHWORK

	CUT (C.Y.)	FILL (C.Y.)
RAW EARTHWORK:	14,620	7,830
OVEREX & RECOMPACT:	29,200	29,200
SUBSIDENCE (0.1"):	-(1,500)	0
SUBTOTAL:	42,320	0
SHRINKAGE (12.5%):	(5,290)	0
SURFACE ORGANICS & OTHER LOSSES	---	0
TOTAL:	37,030	37,030
NET IMPORT/EXPORT - 0 (C.Y.)	---	0

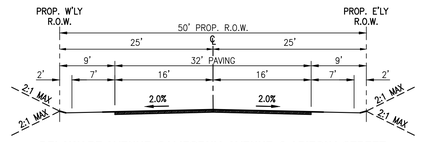
0 50 100 150 200

GRAPHIC SCALE

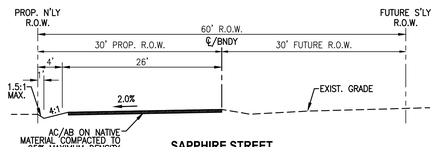
SCALE 1"=100'



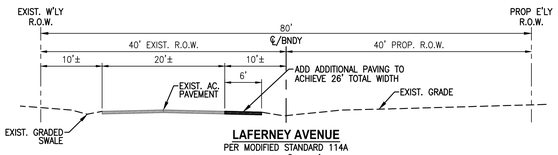
EAST BROADWAY
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



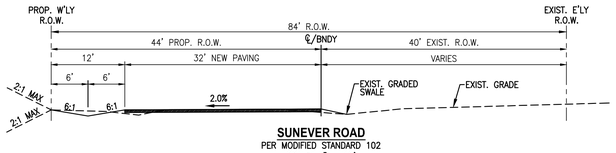
DELAWARE AVENUE, CALIFORNIA AVENUE, & ARIZONA STREET
PER MODIFIED STANDARD 104A
SCALE: 1" = 10'



SAPPHIRE STREET
PER MODIFIED STANDARD 111
SCALE: 1" = 10'



LAFERNEY AVENUE
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



SUNEVER ROAD
PER MODIFIED STANDARD 102
SCALE: 1" = 10'

ENGINEER'S STATEMENT

THIS TENTATIVE TRACT MAP WAS PREPARED UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, ALL EASEMENTS OF RECORD ARE SHOWN PER THE TITLE REPORT DATED _____ BY _____ TITLE COMPANY.

RICHARD DAIL REAVES, RCE 80614 DATE

DRAINAGE NOTE

CROSS-LOT DRAINAGE EXISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL AGREE TO ACCEPT RUNOFF FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED RUNOFF IS NOT ALTERED. EACH LOT OWNER SHALL AGREE NOT TO ALTER THE QUANTITY OR QUALITY OF THE RUNOFF FROM THEIR LOT ONTO THE ADJACENT PROPERTY. NO LOT GRADING WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAD GRADING, SWALES AND RUNOFF MITIGATION.

ENGINEER

DAVID CURRINGTON
ENGINEERING SOLUTIONS
31600 RAILROAD CANYON RD., SE J
CANYON LAKE, CA 92587
PHONE: (951) 333-1001
EMAIL: davidc@engineeringsolutionsca.com

OWNER/APPLICANT

KIM CHEN
J.T. SANTORI VILLA LLC
1751 COLORADO BLVD., #333
LOS ANGELES, CA 90041
PHONE: (626) 673-2672
EMAIL: kim@homeparadiserg.com

Underground Service Alert
CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 • Fax:(951) 688-0599

RICHARD DAIL REAVES R.C.E. 80614 — DATE EXP. 03-31-27

REGISTERED PROFESSIONAL ENGINEER RICHARD DAIL REAVES NO. 80614 EXP. 03/31/27 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF LAND USE SERVICES

SAN BERNARDINO COUNTY

RECOMMENDED BY:

APPROVED BY: _____ DATE

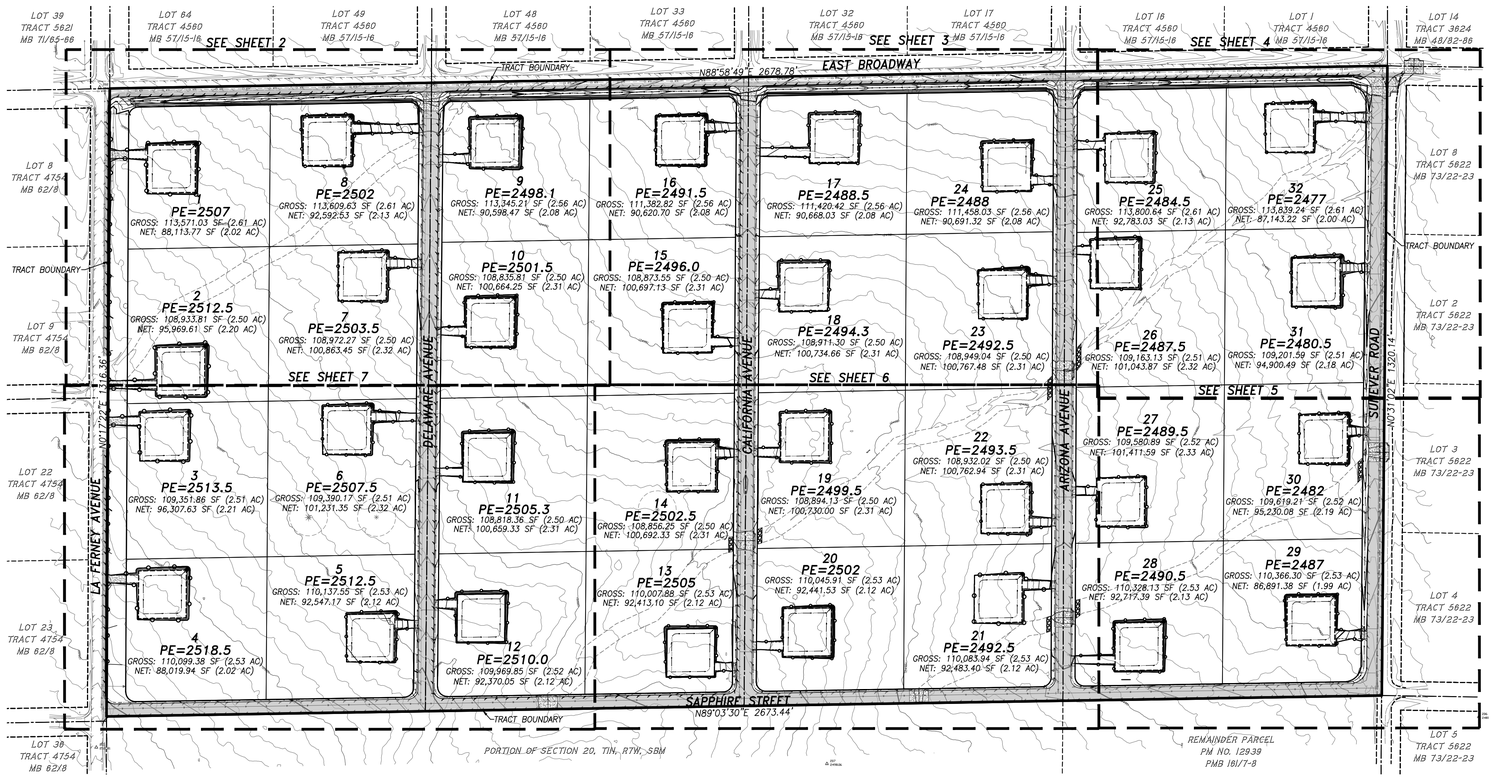
TENTATIVE TRAC.T MAP

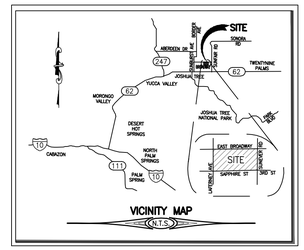
TRAC.T No. 20668
APN: 0605-051-01
JOSHUA TREE

DATE PREPARED: 7/19/2024
DATE:
FILE NO.
SHEET 1 OF 1

IN THE COUNTY OF SAN BERNARDINO, SATE OF CALIFORNIA

TRACT MAP NO. 20668
ROUGH GRADING PLAN





0 75 150 300 450 600

SCALE: 1" = 150'

GRADING NOTES:

1) ALL GRADING SHALL CONFORM TO THE LATEST CALIFORNIA BUILDING CODE (CBC) CHAPTERS 17, 18, APPENDIX J AND ALL APPLICABLE SECTIONS.
2) A GRADING PERMIT SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF ANY WORK ON THE SITE.
3) ISSUANCE OF A GRADING PERMIT DOES NOT ELIMINATE THE NEED FOR PERMITS FROM OTHER REGULATORY AGENCIES WITH REGULATORY RESPONSIBILITIES FOR CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE WORK AUTHORIZED IN THIS PLAN.
4) ALL WORK UNDER THIS PERMIT SHALL BE LIMITED TO WORK WITHIN THE PROPERTY LINES. A SEPARATE CONSTRUCTION, EXCAVATION OR ENCROACHMENT PERMIT FROM THE DEPARTMENT OF PUBLIC WORKS MAY BE REQUIRED FOR ANY WORK WITHIN THE COUNTY RIGHT-OF-WAY.
5) APPROVAL OF THESE PLANS DOES NOT AUTHORIZE ANY WORK OR GRADING TO BE PERFORMED UNTIL A VALID GRADING PERMIT HAS BEEN ISSUED.
6) THIS PLAN IS FOR GRADING PURPOSES ONLY AND IS NOT TO BE USED FOR THE PURPOSE OF CONSTRUCTING ONSITE OR OFFSITE IMPROVEMENTS. ISSUANCE OF A PERMIT BASED ON THIS PLAN DOES NOT CONSTITUTE APPROVAL OF DRIVEWAY LOCATIONS OR SIZES, PARKING LOT STRUCTURAL SECTIONS OR LAYOUT, ADA-RELATED REQUIREMENTS, BUILDING LOCATIONS OR FOUNDATIONS, WALLS, CURBING, OFFSITE DRAINAGE FACILITIES OR OTHER ITEMS NOT RELATED DIRECTLY TO THE BASIC GRADING OPERATION. ONSITE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE TO THE APPROVED BUILDING PERMIT PLANS. OFFSITE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE TO PLANS APPROVED FOR THIS PURPOSE BY THE PUBLIC WORKS DEPARTMENT.
7) MAXIMUM CUT AND FILL SLOPE = 2:1 (HORIZONTAL TO VERTICAL) AND MAXIMUM VERTICAL HEIGHT = 30 FEET, UNLESS AN APPROVED GEOTECHNICAL REPORT CAN JUSTIFY A STEEPER AND TALLER SLOPE.
8) NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL AND OTHER DELETERIOUS MATERIAL.
9) FILL SLOPES SHALL NOT HAVE LESS THAN 90% RELATIVE COMPACTION, OR AS RECOMMENDED ON THE APPROVED GEOTECHNICAL REPORT.
10) IT IS THE GRADING CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ADEQUATE COMPACTION HAS BEEN ATTAINED ON THE ENTIRE GRADING SITE, INCLUDING FILL AREAS OUTSIDE THE BUILDING PADS AND ON ALL FILL SLOPES.
11) UNLESS OTHERWISE RECOMMENDED IN AN APPROVED GEOTECHNICAL REPORT, OVER-EXCAVATION SHALL BE AT LEAST 24 INCHES MINIMUM BELOW THE BOTTOM OF FOOTINGS OR TO COMPETENT NATIVE SOIL OR BEDROCK MATERIALS, WHICHEVER IS DEEPER, AS APPROVED BY THE PROJECT'S GEOTECHNICAL ENGINEER OR GEOLOGIST.
12) EARTHWORK VOLUMES:
CUT_____(CY), FILL___ _ (CY), TOTAL DISTURBED AREA _ (SF)
13) EARTHWORK QUANTITIES ARE SHOWN FOR GRADING PERMIT PURPOSES ONLY, AND SAN BERNARDINO COUNTY IS NOT RESPONSIBLE FOR THEIR ACCURACY.
14) A COPY OF THE GRADING PERMIT AND APPROVED GRADING PLANS MUST BE IN THE POSSESSION OF A RESPONSIBLE PERSON AND AVAILABLE AT THE SITE AT ALL TIMES.
15) ANY ONSITE RETAINING WALLS SHOWN ON THE GRADING PLANS THAT ARE OVER 4' IN HEIGHT, MEASURED FROM TOP OF WALL TO BOTTOM OF FOOTING, ARE FOR REFERENCE ONLY. RETAINING WALLS OVER 4' IN HEIGHT ARE NOT CHECKED, PERMITTED, OR INSPECTED PER THE GRADING PERMIT. A SEPARATE RETAINING WALL PERMIT IS REQUIRED FOR ALL RETAINING WALLS OVER 4' IN HEIGHT.
16) ANY WALLS, FENCES, STRUCTURES AND/OR APPURTENANCES ADJACENT TO THIS PROJECT ARE TO BE PROTECTED IN PLACE. IF GRADING OPERATIONS DAMAGE OR ADVERSELY AFFECT SAID ITEMS IN ANY WAY, THE CONTRACTOR AND/OR DEVELOPER IS RESPONSIBLE FOR WORKING OUT AN ACCEPTABLE SOLUTION TO THE SATISFACTION OF THE AFFECTED PROPERTY OWNER(S).
17) FOR SITES WITH PROTECTED SPECIES OR TREES, THE PROPOSED GRADING MAY BE SUBJECT TO A SEPARATE PERMIT.
18) ADEQUATE FIRE ACCESS AROUND BUILDINGS (INCLUDING GARAGES) SHOULD BE PROVIDED AS APPROVED BY COUNTY FIRE.
19) EXISTING DRAINAGE COURSES SHALL NOT BE OBSTRUCTED, ALTERED, OR DIVERTED WITHOUT PRIOR APPROVAL FROM THE COUNTY OF SAN BERNARDINO, LAND DEVELOPMENT DIVISION. A STREAMBED ALTERATION AGREEMENT MAY ALSO BE REQUIRED FROM THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
20) DRAINAGE EASEMENTS SHALL NOT BE OBSTRUCTED, ALTERED OR DIVERTED WITHOUT PRIOR APPROVAL OF THE COUNTY OF SAN BERNARDINO, LAND DEVELOPMENT DIVISION.
21) SETBACKS AND BUILDING LOCATIONS SHOWN ON THIS PLAN ARE FOR REFERENCE ONLY AND MUST BE REVIEWED AND APPROVED UNDER A SEPARATE BUILDING PERMIT.
22) UTILITY AND SEPTIC IMPROVEMENTS SHOWN ON THIS PLAN ARE FOR REFERENCE ONLY AND MUST BE REVIEWED AND APPROVED UNDER A SEPARATE BUILDING PERMIT.
23) ON PROJECTS DISTURBING ONE ACRES OR MORE, THE FOLLOWING NOTE MUST BE ADDED: A NOTICE OF INTENT (NOI) HAS BEEN, OR WILL BE FILED WITH THE STATE WATER RESOURCES CONTROL BOARD (SWRCB) AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) HAS BEEN OR WILL BE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF CALIFORNIA GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (PERMIT NO. CAS000002) FOR ALL OPERATIONS ASSOCIATED WITH THESE PLANS. THE PERMITTEE SHALL KEEP A COPY OF THE SWPPP ON SITE AND AVAILABLE FOR REVIEW BY THE COUNTY.
24) IN CONJUNCTION WITH THE CALIFORNIA GENERAL PERMIT FOR PROPOSED DISTURBANCE OVER ONE ACRE, AN ACTIVE WASTEWATER DISCHARGE ID # (WDID) _____MUST BE INCLUDED ON THE FINAL GRADING PLAN.
25) A FINAL GRADING CERTIFICATION WILL BE COLLECTED BY THE BUILDING INSPECTOR AT THE FINAL BUILDING INSPECTION OR PRIOR TO A GRADING FINAL STATUS ON THE PERMIT. THE FINAL GRADING CERTIFICATION IS TO BE COMPLETED BY THE ENGINEER OF RECORD.
26) THE SOILS ENGINEER SHALL PROVIDE A FINAL SOIL GRADING REPORT INCLUDING LOCATIONS AND ELEVATIONS OF FIELD DENSITY TESTS, SUMMARIES OF FIELD AND LABORATORY TESTS AND OTHER SUBSTANTIATING DATA AND COMMENTS ON ANY CHANGES MADE DURING GRADING AND THEIR EFFECT ON THE RECOMMENDATIONS MADE IN THE SOIL ENGINEERING INVESTIGATION REPORT. IT SHALL ALSO PROVIDE INFORMATION AS TO LOCATION AND NATURE OF TESTS, STATEMENTS RELATIVE TO THE EXPANSIVE NATURE OF SOIL AND/OR ROCK MATERIAL, LIMITS OF COMPACTED FILL SHOWN ON THE AS-GRADED PLAN AND CERTIFICATION AS TO THE ADEQUACY AND STABILITY OF THE SITE FOR THE INTENDED USE.
27) IF APPLICABLE, THE ENGINEERING GEOLOGIST SHALL PROVIDE A GEOLOGIC GRADING REPORT INCLUDING A FINAL DESCRIPTION OF THE GEOLOGY OF THE SITE INCLUDING ANY NEW INFORMATION DISCLOSED DURING THE GRADING AND THE EFFECT OF SAME ON RECOMMENDATIONS INCORPORATED IN THE APPROVED GRADING PLAN. THE ENGINEERING GEOLOGIST SHALL PROVIDE CERTIFICATION AS TO THE ADEQUACY OF THE SITE FOR THE INTENDED USE AS AFFECTED BY GEOLOGIC FACTORS. WHERE NECESSARY, A REVISED GEOLOGIC MAP AND CROSSSECTIONS, AND ANY RECOMMENDATIONS REGARDING SPECIAL BUILDING RESTRICTIONS OR FOUNDATION SETBACKS SHALL BE INCLUDED.
28) SHOULD THE EXCAVATION DISCLOSE SOIL AND/OR ROCK CONDITIONS WHERE CUT SLOPES ARE UNSTABLE, THE ENGINEERING GEOLOGIST AND/OR THE SOILS ENGINEER SHALL RECOMMEND NECESSARY TREATMENT TO THE BUILDING OFFICIAL FOR APPROVAL.
29) GEOLOGICAL AND SOILS ENGINEERING REPORTS BY _____, DATED _____ AND ALL SOILS REPORT ADDENDUM(DA) SHALL BE INCORPORATED HEREWITH AND MADE PART OF THIS GRADING PLAN.
30) THE CONTRACTOR SHALL IMPLEMENT PREVENTIVE MEASURES TO ASSURE THAT NO ROCKS, SOIL, DUST, OR DEBRIS OF ANY FORM SHALL FALL, SLIDE OR FLOW ONTO ADJOINING PROPERTIES OR PUBLIC WAYS. ALL VEHICLE LOADS SHALL BE TRIMMED AND WATERED OR OTHERWISE SECURED TO PREVENT SPILLAGE FROM THE EQUIPMENT.
31) ALL EXPORT AND IMPORT OF MATERIAL OVER DEDICATED AND IMPROVED STREETS SHALL BE UNDERTAKEN OR CONDUCTED BY EQUIPMENT THAT COMPLIES IN ALL RESPECTS TO THE STATE VEHICLE CODE. REPAIR TO ANY DAMAGED DEDICATED OR IMPROVED STREETS SHALL BE MADE TO THE SATISFACTION OF THE BUILDING OFFICIAL AND IS THE RESPONSIBILITY OF THE OWNER, PERMITTEE, AND THE GRADING CONTRACTOR.
32) ALL FLOOD ZONE REQUIREMENTS MUST BE REFLECTED OR ACCOUNTED FOR ON THE GRADING PLANS. ELEVATIONS OR CONSTRUCTION NOTES MUST BE INCLUDED IN THE PLANS TO ENSURE COMPLIANCE WITH ALL APPLICABLE FIRST FLOOR ELEVATION REQUIREMENTS PER FEMA AND SAN BERNARDINO COUNTY DEVELOPMENT CODE GUIDELINES.
33) ALL GRADING SHALL COMPLY WITH SBC DEVELOPMENT CODE SECTION 82.14.050.C:
IF FILL IS PLACED TO ELEVATE PADS ABOVE BASE ELEVATION, IT MUST BE DEMONSTRATED THAT FILL WILL NOT SETTLE AND IS PROTECTED FROM EROSION, SCOUR, OR DIFFERENTIAL SETTLEMENT, AS FOLLOWS.
a) THE PAD ELEVATION SHALL BE CERTIFIED TO MEET OR EXCEED THE ELEVATION REQUIRED BY THE APPLICABLE FLOODPLAIN SAFETY REVIEW AREA, AND IT MUST BE DEMONSTRATED THAT THE CUMULATIVE EFFECT OF THE PROPOSED DEVELOPMENT WHEN COMBINED WITH ALL OTHER EXISTING AND ANTICIPATED DEVELOPMENT WILL NOT INCREASE THE WATER SURFACE ELEVATION OF THE BASE FLOOD AT ANY POINT WITHIN THE COMMUNITY.
b) FILL SHALL BE COMPACTED TO 95 PERCENT PER ASTM (AMERICAN SOCIETY OF TESTING MATERIALS) STANDARD D-698.
c) FILL SLOPES SHALL BE NO STEEPER THAN TWO FEET HORIZONTAL TO ONE FOOT VERTICAL RATIO UNLESS SUBSTANTIATING DATA FOR STEEPER SLOPES IS PROVIDED, AND THE SLOPES ARE APPROVED BY THE COUNTY.
d) FILL SLOPES ADJACENT TO A WATER COURSE MAY BE REQUIRED TO BE ARMORED WITH STONE, ROCK OR APPROVED EQUAL PROTECTION.
34) FOR NONRESIDENTIAL PROJECTS, PROVIDE FOLLOWING NOTE ON PLANS: CALIFORNIA GREEN BUILDING STANDARDS CODE
5.408.3 EXCAVATED SOIL AND LAND CLEARING DEBRIS.
100 PERCENT OF TREES, STUMPS, ROCKS AND ASSOCIATED VEGETATION AND SOILS RESULTING PRIMARILY FROM LAND CLEARING SHALL BE REUSED OR RECYCLED. FOR A PHASED PROJECT, SUCH MATERIAL MAY BE STOCKPILED ON SITE UNTIL THE STORAGE SITE IS DEVELOPED.
EXCEPTION: REUSE, EITHER ON-OR OFF-SITE, OF VEGETATION OR SOIL CONTAMINATED BY DISEASE OR PEST INFESTATION.

SOILS ENGINEER'S CERTIFICATION:

THIS GRADING PLAN HAS BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN CONFORMANCE WITH THE RECOMMENDATIONS AS OUTLINED IN THE FOLLOWING SOILS AND GEOLOGICAL REPORT FOR THIS PROJECT.

REPORT TITLE:
REPORT DATE:
FIRM NAME:

DATE SEAL

CONSTRUCTION NOTES & QUANTITIES

THE QUANTITIES SHOWN BELOW ARE FOR BONDING INFORMATION ONLY. THE CONTRACTOR IS TO CONSTRUCT PROJECT PER THESE PLANS AND SUBMIT CONSTRUCTION BID BASED ON THEIR OWN QUANTITY "TAKE-OFF".

(1) INSTALL ¼ TON RIP-RAP, #2 BACKING.....1,521 SF
(2) INSTALL 3'X10' ¼ TON RIP-RAP PAD.....2,623 SF

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBER: 0605-051-01

DRAINAGE NOTE:

CROSS-LOT DRAINAGE EXISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL AGREE TO ACCEPT RUNOFF FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED RUNOFF IS NOT ALTERED. EACH LOT OWNER SHALL AGREE NOT TO ALTER THE QUANTITY OR QUALITY OF THE RUNOFF FROM THEIR LOT ONTO THE ADJACENT PROPERTY. NO LOT GRADING WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAD GRADING, SWALES AND RUNOFF MITIGATION.

LEGEND

CL	CENTERLINE	P.I.P.	PROTECT IN PLACE
EP	EDGE OF PAVEMENT	R/W	RIGHT OF WAY
EX.	EXISTING	TYP.	TYPICAL
FL	FLOW LINE	WTR	WATER
FS	FINISHED SURFACE		
FG	FINISHED GROUND		
HP	HIGH POINT		
LP	LOW POINT		
N.T.S.	NOT TO SCALE		
PE	PAD ELEVATION		
PROP.	PROPOSED		
PL	PROPERTY LINE		

CENTERLINE
PROP. RIGHT OF WAY
EX. RIGHT OF WAY
PROPERTY LINE
EX. PROPERTY LINE
PROJECT BOUNDARY
MAJOR EX. CONTOUR
MINOR EX. CONTOUR
PROP. MAJOR CONTOUR
PROP. MINOR CONTOUR
FLOW LINE
EDGE OF PAVEMENT
EX. FENCE
PROP. DAYLIGHT
PROP. ASPHALT
PROP. CONCRETE

EARTHWORK

	CUT (C.Y.)	FILL (C.Y.)
RAW EARTHWORK:	13,077	27,320
NET IMPORT/EXPORT = O (C.Y.)	---	14,243

ENGINEER

ADKAN ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA 92504
TELEPHONE: (951) 688-0241
EMAIL: RREAVES@ADKAN.COM

ASSESSORS PARCEL NUMBERS

0605-051-01

OWNER/DEVELOPER

KIM CHEN
J.T. SANTORI VILLA LLC
1751 COLORADO BLVD., #333
LOS ANGELES, CA 90041
PHONE: (626) 673-2672
EMAIL: kim@homeparadiserg.com

SOILS ENGINEER

SLADDEN ENGINEERING
45090 GOLF CENTER PARKWAY, STE F
INDIO, CA 92201
TELEPHONE: (760) 863-0713

UTILITIES

ELECTRIC:
SOUTHERN CALIFORNIA EDISON
P.O. BOX 11482
SANTA ANA, CA 92711
(714) 796-9920

TRASH SERVICES:
4878 NEWTON ROAD
YUCCA VALLEY, CA 92284
(760) 340-2113

WATER:
JOSHUA BASIN WATER DIST.
61750 CHOLITA RD.
JOSHUA TREE, CA 92252
(760) 336-8438

TELEPHONE:
AT&T
(800) 310-2355

GAS:
SOUTHERN CALIFORNIA GAS COMPANY
(800)742-2200
DEVELOPER WILL USE PROPANE

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9191

BASIS OF BEARINGS

THE CENTERLINE OF SUNEVER AVENUE BEING NORTH 00°31'35" EAST PER PARCEL MAP NO. 12939, FILED IN BOOK 161 OF PARCEL MAPS, AT PAGES 7 AND 8, RECORDS OF SAN BERNARDINO COUNTY, WAS HELD AS THE BASIS OF BEARINGS FOR THIS MAP.

SHEET INDEX

SHEET 1:	TITLE SHEET
SHEET 2-7:	GRADING
SHEET 8:	SECTIONS
SHEET 9:	EROSION CONTROL

Underground Service Alert
DIAL BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK
BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER RICHARD DAIL REAVES NO. 80614 EXP. 03/31/27 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH DATE
LAND DEVELOPMENT MANAGER

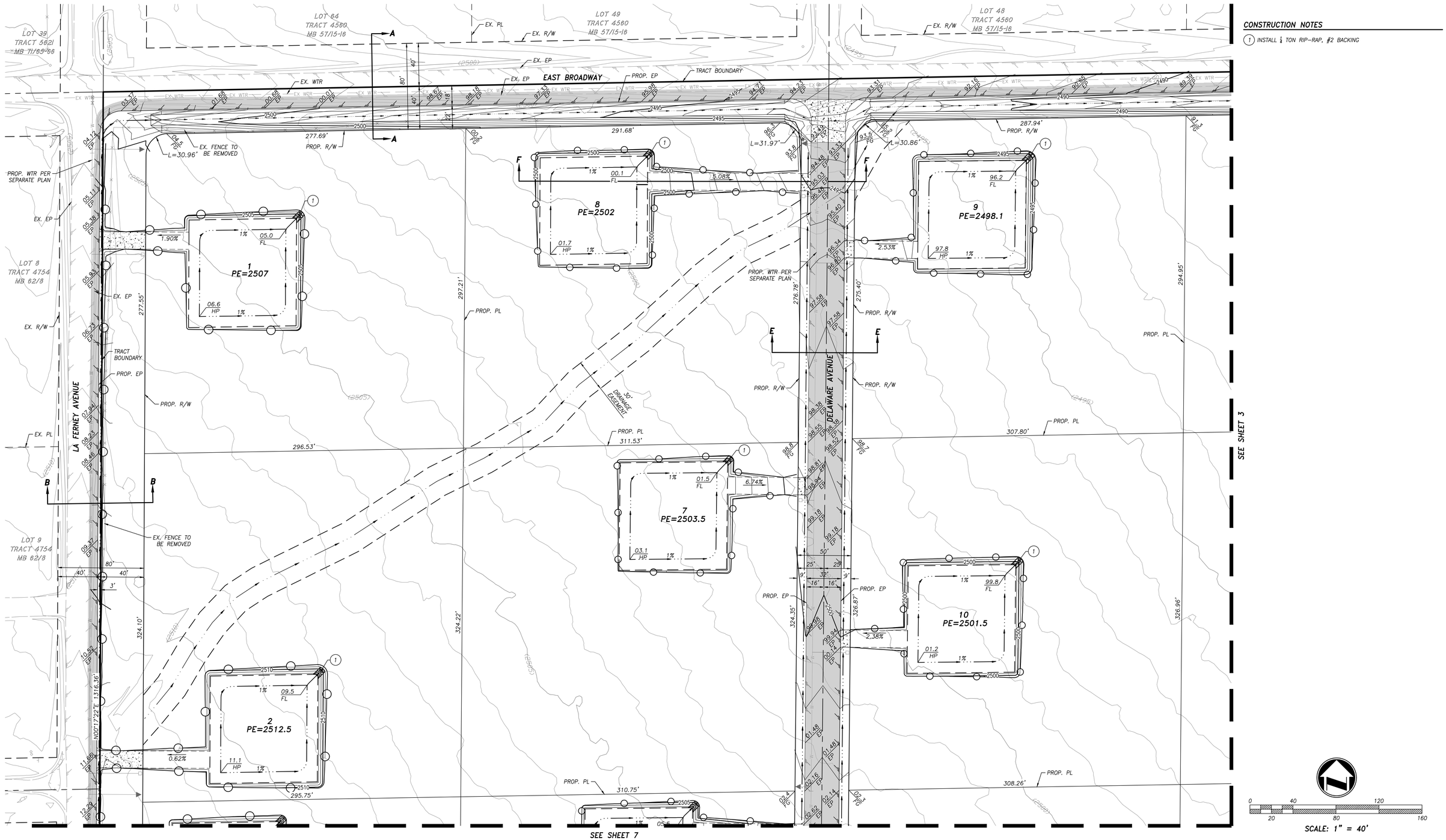
TITLE SHEET

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 1 OF 9



CONSTRUCTION NOTES

(1) INSTALL ½ TON RIP-RAP, #2 BACKING

0 20 40 80 120 160

SCALE: 1" = 40'

Underground Service Alert

CALL BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering - Surveying - Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

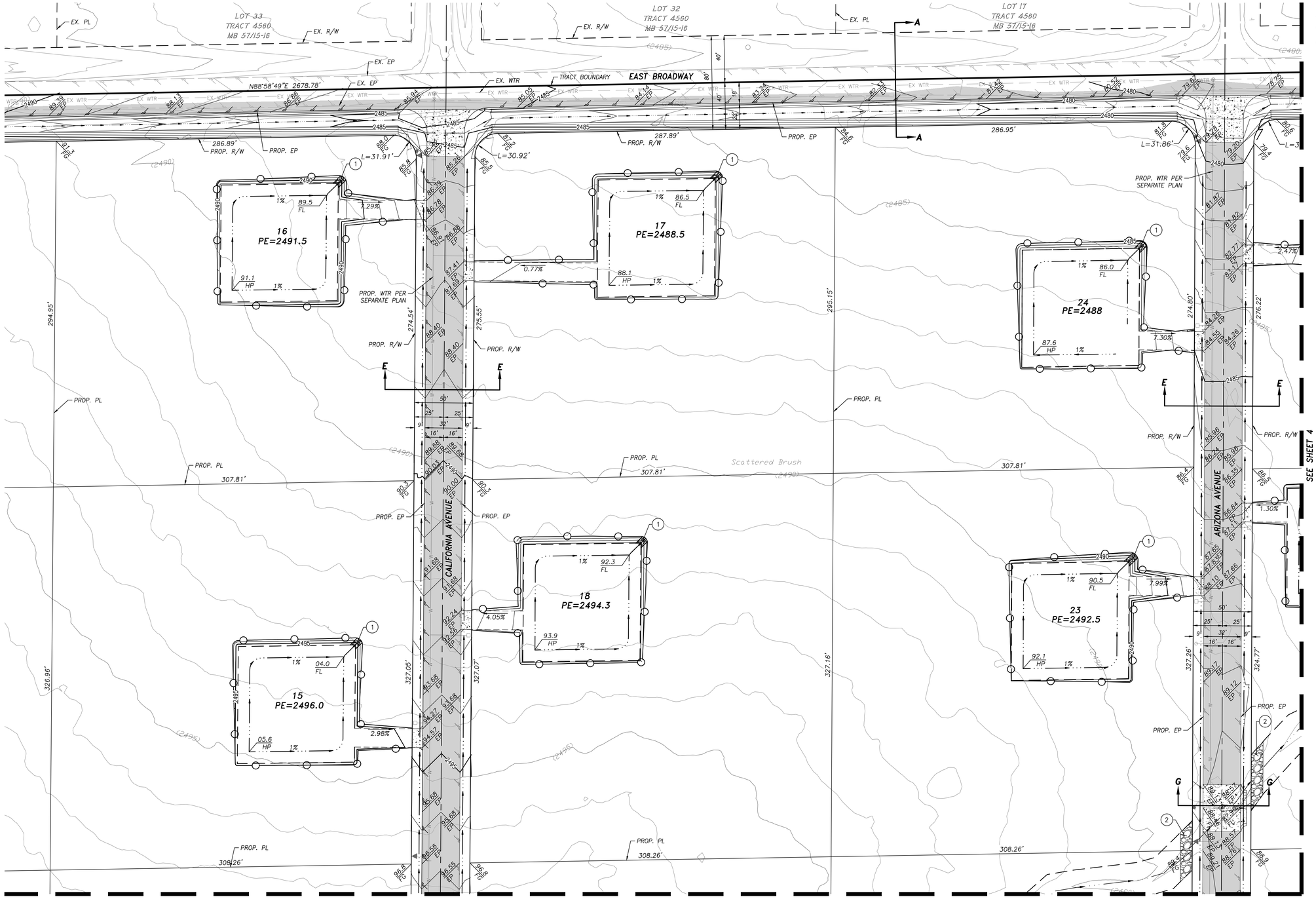
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 2 OF 9



CONSTRUCTION NOTES

1. INSTALL ¼ TON RIP-RAP, #2 BACKING
2. INSTALL 3'X10' ¼ TON RIP-RAP PAD

Underground Service Alert

DIG BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

RECOMMENDED BY:

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

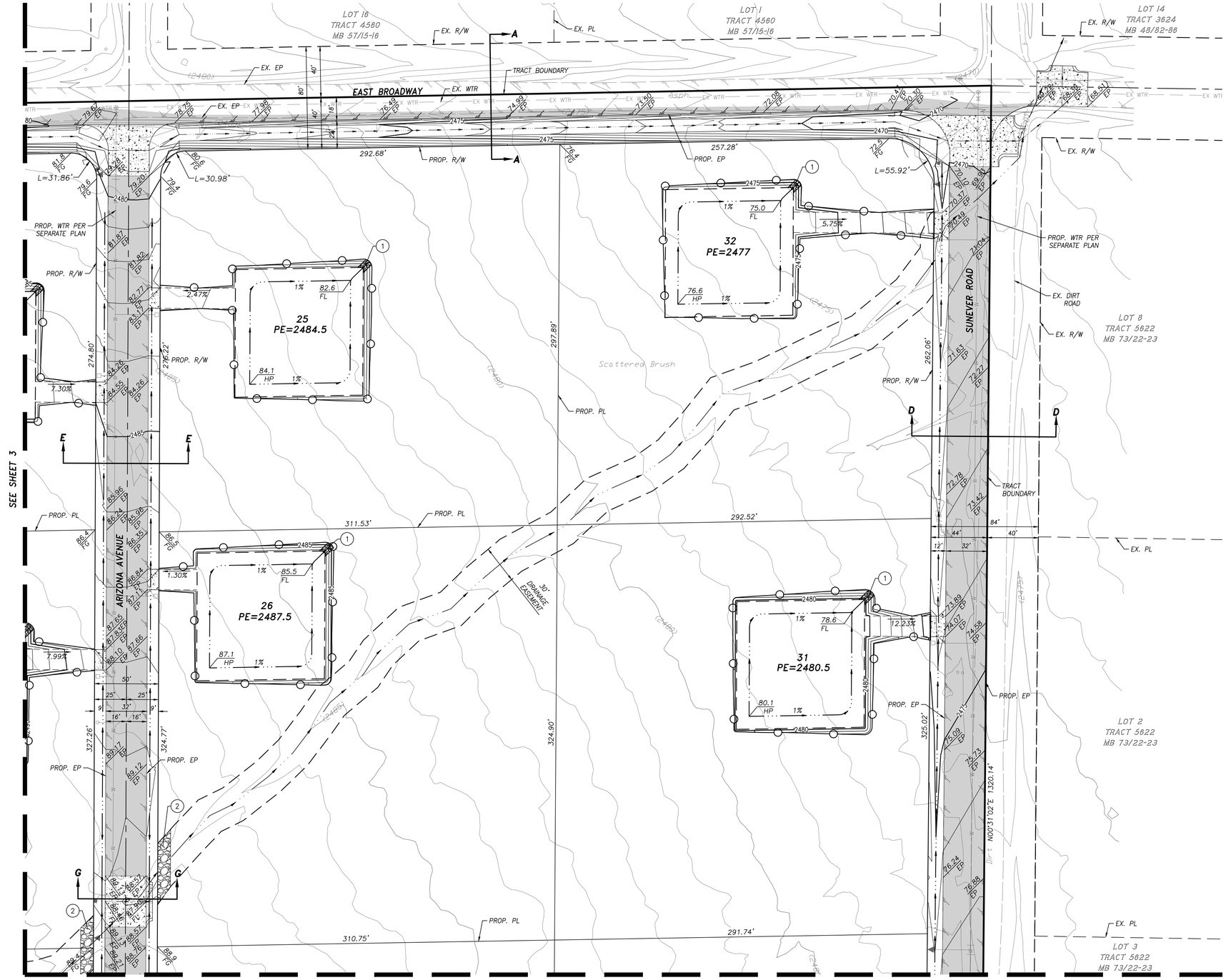
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 3 OF 9



CONSTRUCTION NOTES

1. INSTALL ¼ TON RIP-RAP, #2 BACKING
2. INSTALL 3'X10' ¼ TON RIP-RAP PAD

Underground Service Alert

CALL BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

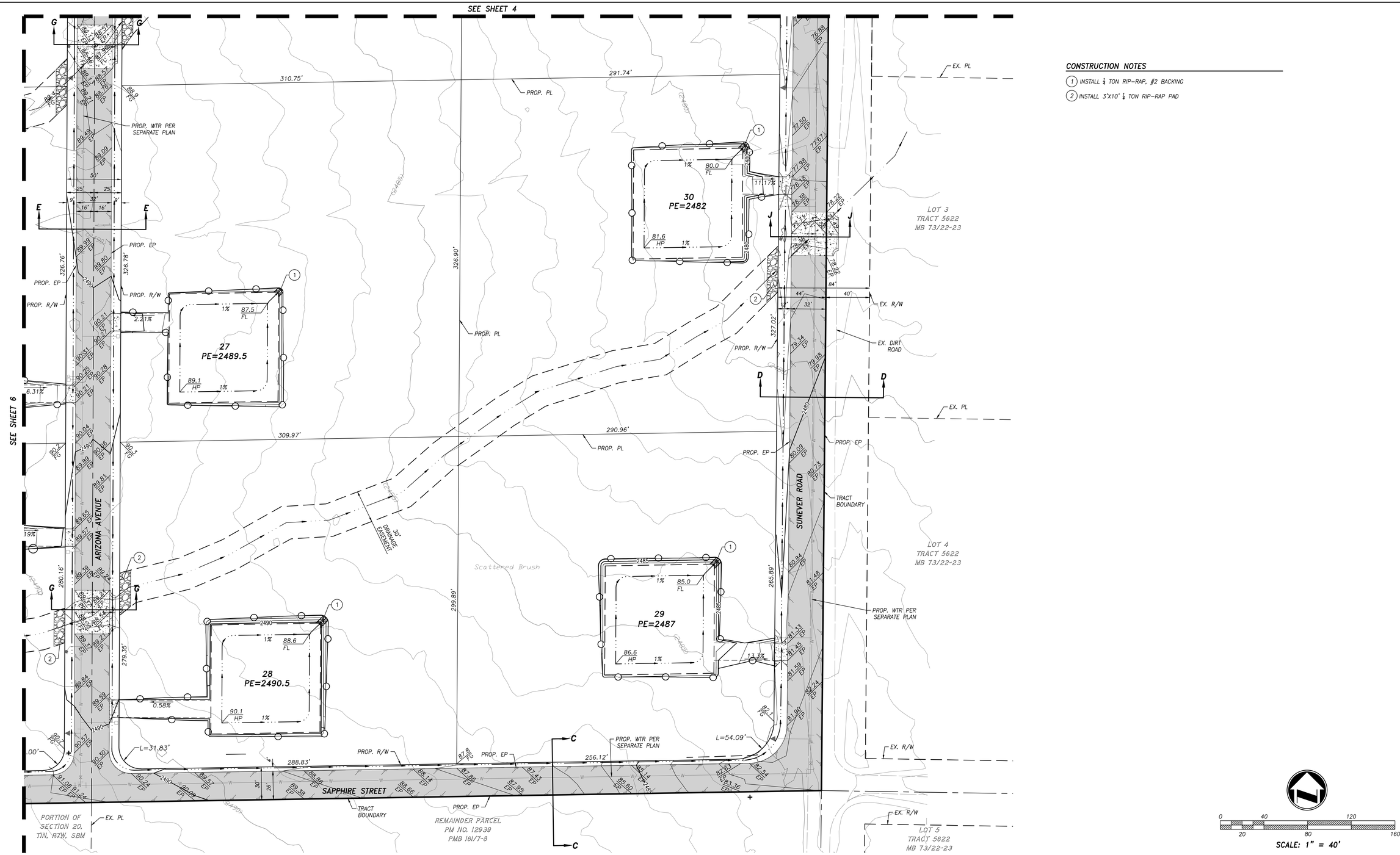
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 4 OF 9



Underground Service Alert

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REYES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REYES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

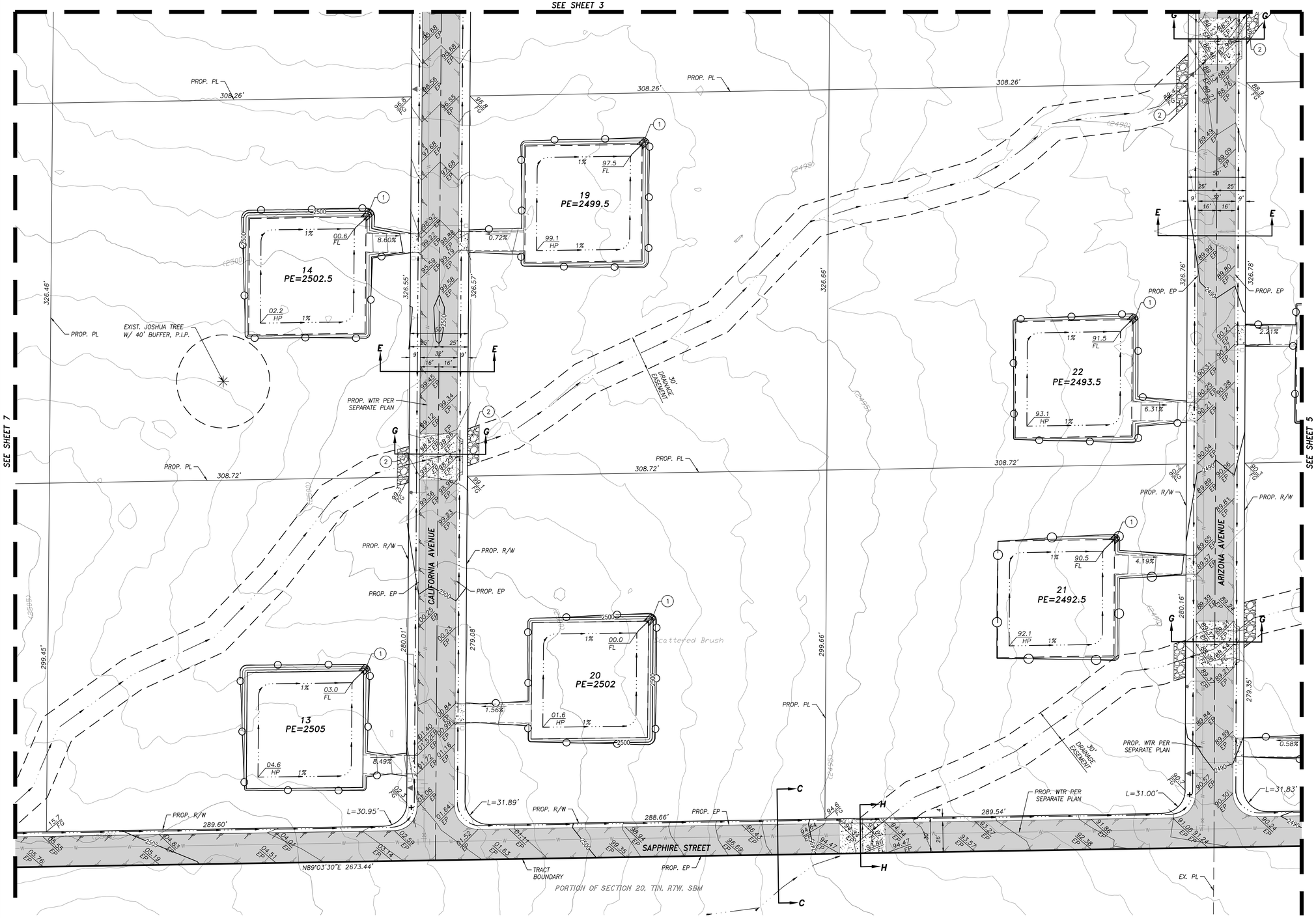
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 5 OF 9



Underground Service Alert

CALL BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

ROUGH GRADING

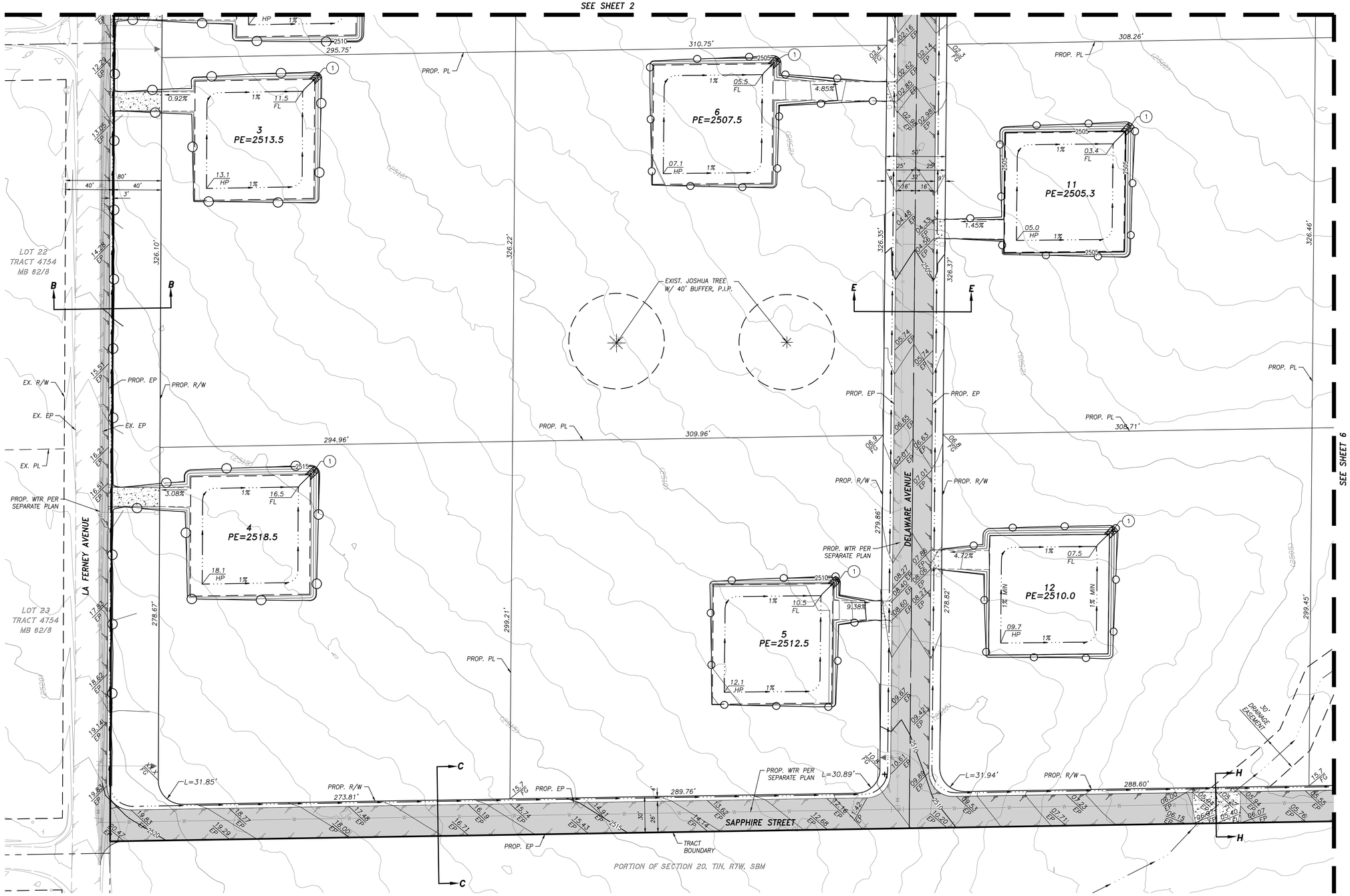
TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 6 OF 9

SEE SHEET 2



SEE SHEET 6

CONSTRUCTION NOTES

(1) INSTALL ¼ TON RIP-RAP, #2 BACKING

0 40 120
20 80 160
SCALE: 1" = 40'

Underground Service Alert
DIG ALERT BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK
BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:
GREG GRIFFITH DATE
LAND DEVELOPMENT MANAGER

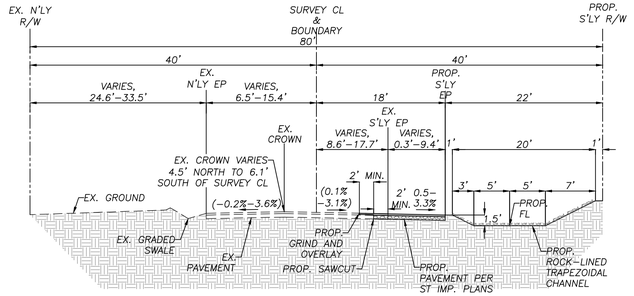
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

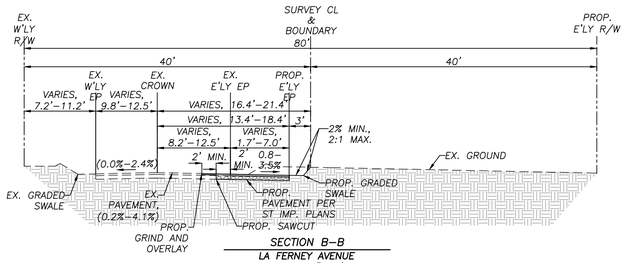
ROAD NO.

FILE NO.

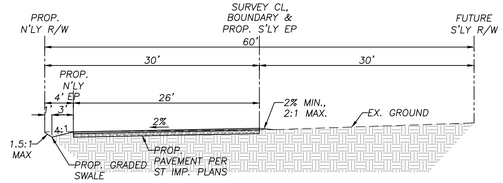
SHEET 7 OF 9



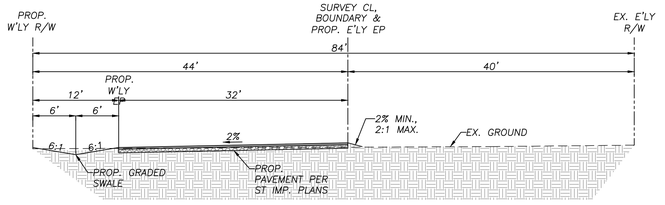
SECTION A–A
EAST BROADWAY
SCALE: 1"=10'



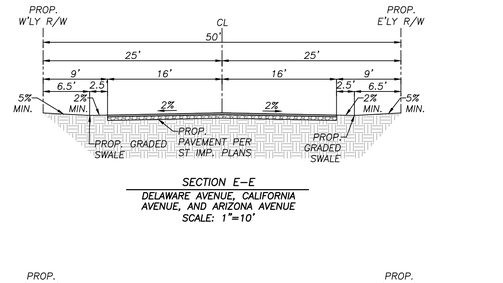
SECTION B–B
LA FERNEY AVENUE
SCALE: 1"=10'



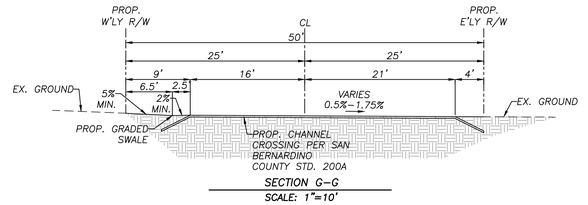
SECTION C–C
SAPPHIRE STREET
SCALE: 1"=10'



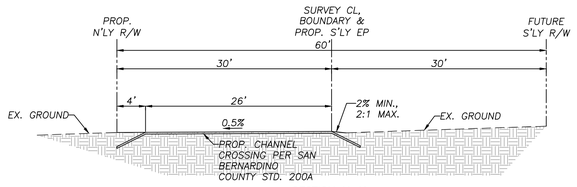
SECTION D–D
SUNEVER ROAD
SCALE: 1"=10'



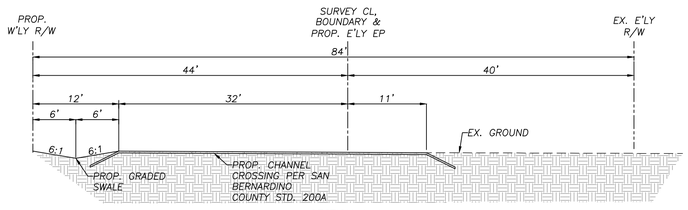
SECTION E–E
DELAWARE AVENUE, CALIFORNIA AVENUE, AND ARIZONA AVENUE
SCALE: 1"=10'



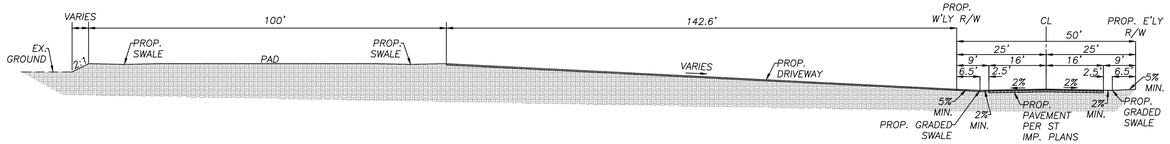
SECTION G–G
SCALE: 1"=10'



SECTION H–H
SCALE: 1"=10'



SECTION J–J
SCALE: 1"=10'



SECTION F–F
SCALE: 1"=20'

Underground Service Alert
DIG BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62–1–11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

SECTIONS

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

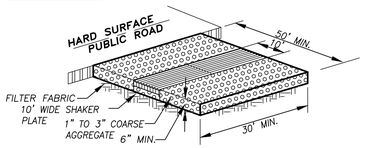
SHEET 8 OF 9

EROSION CONTROL NOTES (LAND DEVELOPMENT DIVISION)

1. IN CASE OF EMERGENCY, CALL (RESPONSIBLE PERSON) AT (24-HOUR TELEPHONE).
2. POLLUTION AND EROSION PREVENTION MEASURES, ALSO KNOWN AS BEST MANAGEMENT PRACTICES (BMPS), MUST BE INSTALLED PRIOR TO GRADING. THESE MEASURES, INCLUDING THE PREVENTION OF SEDIMENTATION OR FLOOD DAMAGE, TO OFFSITE PROPERTY SHALL BE ADEQUATE WHETHER OR NOT AN EROSION CONTROL PERMIT IS REQUIRED.
3. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ONSITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, OR WIND.
4. EROSION CONTROL DEVICES SHALL BE FUNCTIONING AT ALL TIMES. IN CASE OF FAILURE, RAPID CONSTRUCTION OF EMERGENCY DEVICES SHALL BE IMPLEMENTED.
5. STOCKPILES OF EARTH AND OTHER CONSTRUCTION-RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
6. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOILS AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
7. EXCESS OR WASTE CONCRETE MUST BE CONTAINED ONSITE. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ONSITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
8. DEVELOPERS/CONTRACTORS ARE RESPONSIBLE TO ENSURE ALL EROSION CONTROL DEVICES AND BMPS ARE INSTALLED AND FUNCTIONING PROPERLY PER PLAN. PROPER PRECAUTION SHALL BE CONSIDERED WHEN 50% OR GREATER PROBABILITY OF PREDICTED PRECIPITATION, AND AFTER ACTUAL PRECIPITATION. A CONSTRUCTION SITE INSPECTION CHECKLIST AND INSPECTION LOG SHALL BE MAINTAINED AT THE PROJECT SITE AT ALL TIMES AND AVAILABLE FOR REVIEW BY THE BUILDING OFFICIAL.
9. TRASH AND CONSTRUCTION-RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
10. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
11. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.
12. ALL SILT AND DEBRIS SHALL BE REMOVED FROM ALL DEVICES WITHIN 24 HOURS AFTER EACH RAINSTORM AND BE DISPOSED OF PROPERLY.
13. ALL STORM WATER CAPTURE DEVICES SHALL BE PROTECTED AT ALL TIMES.
14. EROSION AND SEDIMENT CONTROL PRACTICES SHOULD BE IN CONFORMANCE WITH STANDARD PRACTICE. THE MOST COMMON EROSION CONTROL MEASURES ARE:
    a. SCHEDULING
    b. PRESERVATION OF EXISTING VEGETATION
    c. STOCKPILE MANAGEMENT
    d. SILT FENCE
    e. FIBER ROLLS
    f. SANDBAG BARRIER
    g. STRAW BALE BARRIER
    h. STORM DRAIN INLET PROTECTION
    i. CONCRETE WASTE MANAGEMENT
    j. VEHICLE AND EQUIPMENT FUELING
    k. VEHICLE AND EQUIPMENT MAINTENANCE
    l. STABILIZED CONSTRUCTION ENTRANCE/EXIT
    m. ENTRANCE/EXIT TIRE WASH
    n. WIND EROSION CONTROL
15. DUST SHALL BE CONTROLLED BY WATERING.

LEGEND

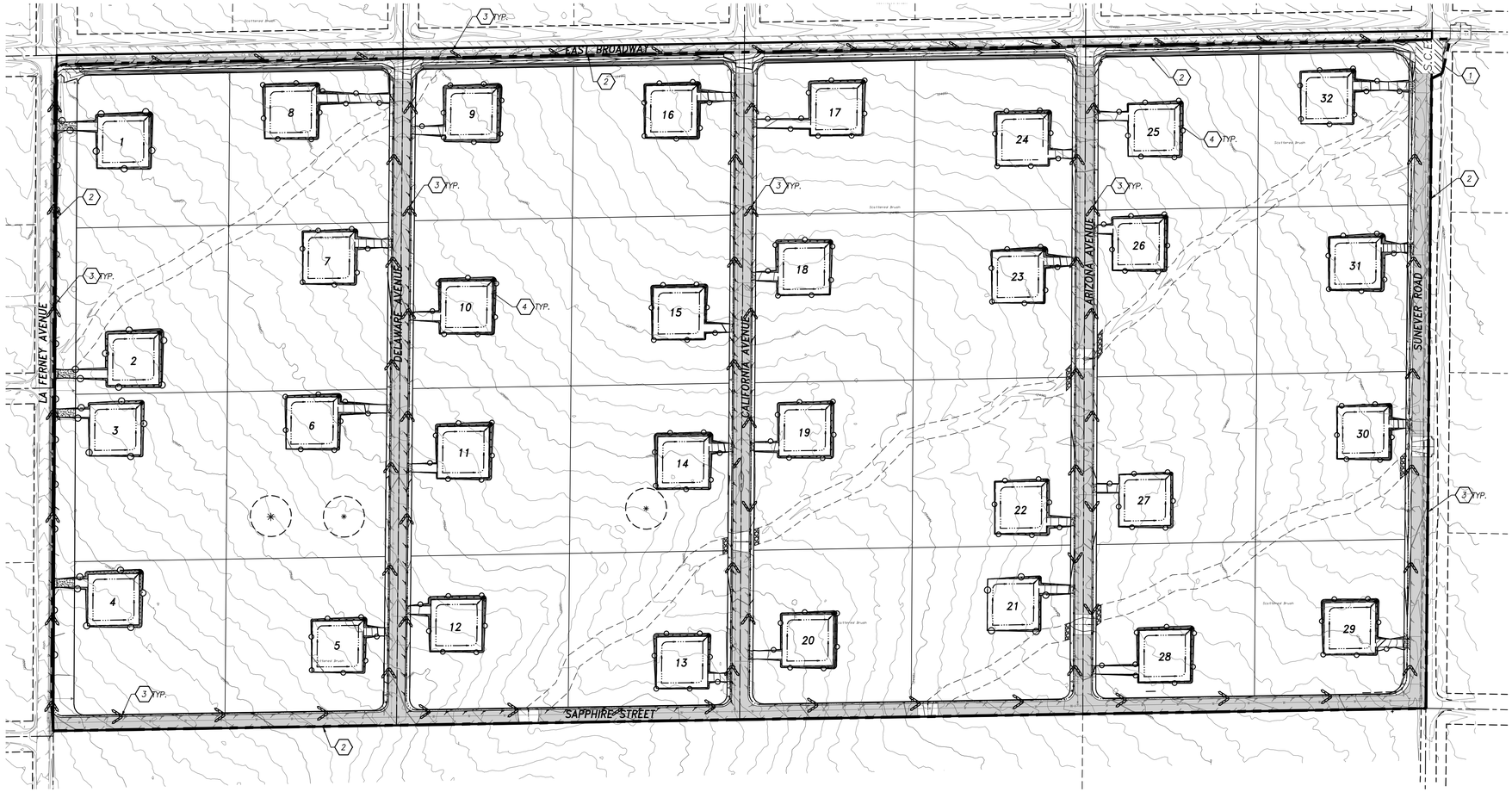
- S.C.E. = STABILIZE CONSTRUCTION ENTRANCE W\GRAVEL
- = SILT FENCE PER DETAIL HEREON
- = GRAVELBAG BARRIER PER DETAIL HEREON
- = HYDROSEED

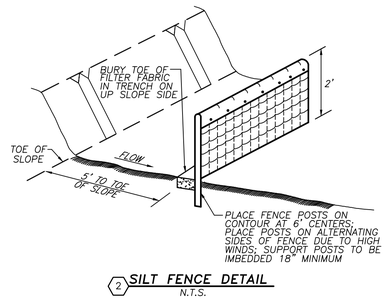


1 STABILIZED CONSTRUCTION ENTRANCE
N.T.S.

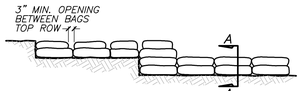
IN THE COUNTY OF SAN BERNARDINO, SATE OF CALIFORNIA

TRACT MAP NO. 20668
EROSION CONTROL PLAN

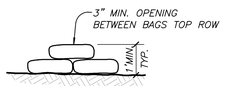




2 SILT FENCE DETAIL
N.T.S.

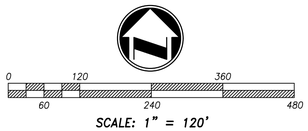


TYPICAL GRAVELBAG DETAIL
N.T.S.



3 GRAVELBAG CONTROL DETAILS
N.T.S.

INLET PROTECTION DETAIL
N.T.S.



SCALE: 1" = 120'

CONSTRUCTION NOTES & QUANTITIES

THE QUANTITIES SHOWN BELOW ARE FOR BONDING PURPOSES ONLY. THE CONTRACTOR IS TO CONSTRUCT PROJECT PER THESE PLANS AND SUBMIT BID BASED ON THEIR OWN QUANTITY "TAKE-OFF."

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE PER CASQA FACT SHEET TC-1 AND DETAIL HEREON.....1 EA
2. INSTALL SILT FENCE PER CASQA FACT SHEET SE-1 AND DETAIL HEREON .....8,000 LF
3. INSTALL GRAVEL BAGS PER CASQA FACT SHEET SE-6 AND DETAIL HEREON.....2,714 LF
4. INSTALL HYDROSEED.....61,140 SF

Underground Service Alert
DIAL BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK
BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

EROSION CONTROL

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 9 OF 9

NOAA Atlas 14, Volume 6, Version 2
Location name: Joshua Tree, California, USA*
Latitude: 34.1628°, Longitude: -116.2685°
Elevation: 2495 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.097 (0.080-0.118)	0.142 (0.117-0.173)	0.207 (0.171-0.254)	0.267 (0.218-0.330)	0.358 (0.283-0.457)	0.436 (0.338-0.569)	0.525 (0.397-0.701)	0.626 (0.461-0.860)	0.782 (0.552-1.12)	0.936 (0.639-1.38)
10-min	0.139 (0.115-0.170)	0.203 (0.168-0.248)	0.297 (0.245-0.365)	0.382 (0.313-0.473)	0.513 (0.405-0.655)	0.625 (0.484-0.815)	0.752 (0.569-1.00)	0.897 (0.660-1.23)	1.12 (0.792-1.60)	1.34 (0.915-1.98)
15-min	0.168 (0.139-0.205)	0.246 (0.203-0.300)	0.360 (0.296-0.441)	0.463 (0.378-0.572)	0.620 (0.490-0.792)	0.756 (0.586-0.986)	0.909 (0.688-1.22)	1.08 (0.798-1.49)	1.36 (0.957-1.94)	1.62 (1.11-2.40)
30-min	0.252 (0.209-0.308)	0.369 (0.305-0.451)	0.540 (0.445-0.662)	0.695 (0.568-0.859)	0.931 (0.736-1.19)	1.14 (0.879-1.48)	1.37 (1.03-1.82)	1.63 (1.20-2.24)	2.04 (1.44-2.91)	2.44 (1.66-3.60)
60-min	0.340 (0.281-0.415)	0.497 (0.411-0.608)	0.727 (0.599-0.891)	0.935 (0.764-1.16)	1.25 (0.991-1.60)	1.53 (1.18-1.99)	1.84 (1.39-2.46)	2.19 (1.61-3.01)	2.74 (1.94-3.92)	3.28 (2.24-4.86)
2-hr	0.441 (0.365-0.538)	0.622 (0.514-0.760)	0.884 (0.728-1.08)	1.12 (0.913-1.38)	1.47 (1.16-1.87)	1.76 (1.36-2.30)	2.09 (1.58-2.79)	2.46 (1.81-3.37)	3.00 (2.12-4.30)	3.48 (2.37-5.15)
3-hr	0.506 (0.419-0.618)	0.707 (0.584-0.864)	0.994 (0.819-1.22)	1.25 (1.02-1.54)	1.63 (1.29-2.08)	1.94 (1.51-2.54)	2.29 (1.73-3.06)	2.68 (1.97-3.68)	3.25 (2.30-4.65)	3.74 (2.55-5.54)
6-hr	0.629 (0.520-0.768)	0.873 (0.721-1.07)	1.22 (1.00-1.49)	1.52 (1.24-1.88)	1.96 (1.55-2.51)	2.33 (1.81-3.04)	2.73 (2.06-3.65)	3.17 (2.33-4.35)	3.81 (2.69-5.45)	4.34 (2.96-6.43)
12-hr	0.743 (0.615-0.908)	1.05 (0.865-1.28)	1.47 (1.22-1.81)	1.84 (1.51-2.28)	2.38 (1.88-3.04)	2.82 (2.19-3.68)	3.30 (2.50-4.41)	3.82 (2.81-5.25)	4.58 (3.23-6.55)	5.20 (3.55-7.70)
24-hr	0.891 (0.790-1.03)	1.29 (1.14-1.48)	1.84 (1.62-2.12)	2.32 (2.03-2.70)	3.01 (2.55-3.62)	3.58 (2.98-4.40)	4.20 (3.41-5.28)	4.87 (3.85-6.30)	5.85 (4.44-7.88)	6.67 (4.89-9.29)
2-day	1.01 (0.897-1.16)	1.49 (1.32-1.72)	2.16 (1.91-2.50)	2.74 (2.40-3.20)	3.60 (3.05-4.33)	4.30 (3.57-5.29)	5.07 (4.11-6.38)	5.91 (4.66-7.64)	7.13 (5.40-9.60)	8.16 (5.98-11.4)
3-day	1.07 (0.950-1.23)	1.59 (1.41-1.84)	2.34 (2.06-2.70)	2.99 (2.62-3.48)	3.94 (3.34-4.74)	4.73 (3.93-5.81)	5.59 (4.54-7.04)	6.54 (5.16-8.46)	7.94 (6.01-10.7)	9.11 (6.67-12.7)
4-day	1.12 (0.989-1.28)	1.67 (1.48-1.93)	2.47 (2.18-2.85)	3.16 (2.77-3.69)	4.19 (3.55-5.04)	5.04 (4.19-6.20)	5.98 (4.85-7.52)	7.00 (5.53-9.06)	8.52 (6.45-11.5)	9.79 (7.17-13.6)
7-day	1.20 (1.06-1.38)	1.82 (1.61-2.10)	2.72 (2.40-3.14)	3.51 (3.07-4.09)	4.67 (3.96-5.62)	5.64 (4.68-6.93)	6.69 (5.43-8.42)	7.86 (6.20-10.2)	9.56 (7.25-12.9)	11.0 (8.06-15.3)
10-day	1.24 (1.10-1.43)	1.91 (1.69-2.20)	2.87 (2.54-3.32)	3.72 (3.26-4.33)	4.97 (4.21-5.98)	6.01 (4.99-7.38)	7.14 (5.79-8.98)	8.38 (6.61-10.8)	10.2 (7.73-13.7)	11.7 (8.59-16.3)
20-day	1.36 (1.21-1.57)	2.13 (1.88-2.46)	3.24 (2.86-3.74)	4.21 (3.68-4.90)	5.65 (4.79-6.80)	6.85 (5.69-8.42)	8.15 (6.61-10.3)	9.58 (7.56-12.4)	11.7 (8.84-15.7)	13.4 (9.81-18.6)
30-day	1.50 (1.33-1.73)	2.36 (2.08-2.72)	3.60 (3.18-4.16)	4.70 (4.11-5.47)	6.33 (5.36-7.62)	7.68 (6.38-9.44)	9.14 (7.41-11.5)	10.7 (8.47-13.9)	13.0 (9.89-17.6)	15.0 (11.0-20.8)
45-day	1.69 (1.50-1.95)	2.66 (2.35-3.07)	4.06 (3.59-4.70)	5.31 (4.65-6.19)	7.16 (6.07-8.62)	8.70 (7.23-10.7)	10.4 (8.40-13.0)	12.2 (9.60-15.7)	14.8 (11.2-19.9)	16.9 (12.4-23.5)
60-day	1.89 (1.67-2.17)	2.96 (2.62-3.41)	4.52 (3.99-5.22)	5.90 (5.17-6.88)	7.96 (6.74-9.58)	9.67 (8.03-11.9)	11.5 (9.34-14.5)	13.5 (10.7-17.5)	16.4 (12.4-22.0)	18.7 (13.7-26.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

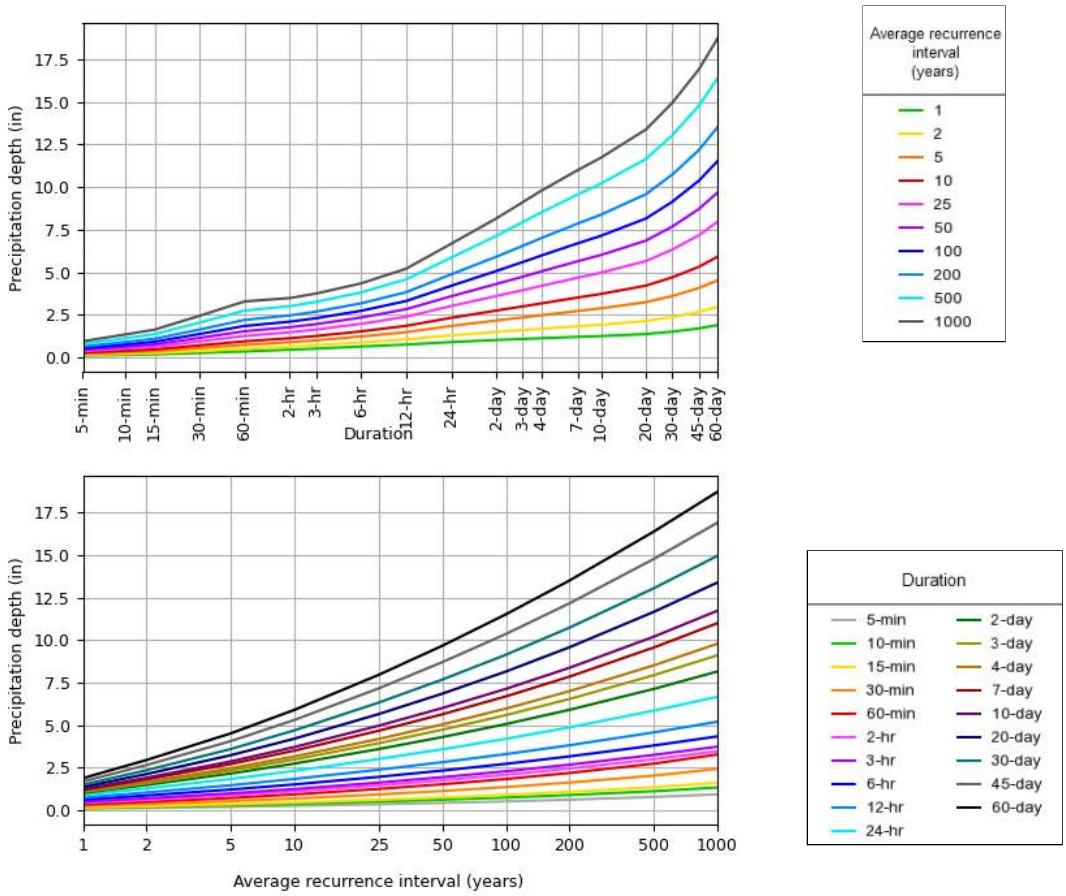
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.1628°, Longitude: -116.2685°



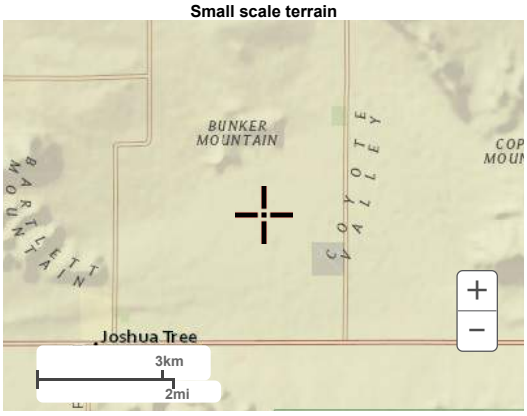
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Nov 19 00:17:10 2024

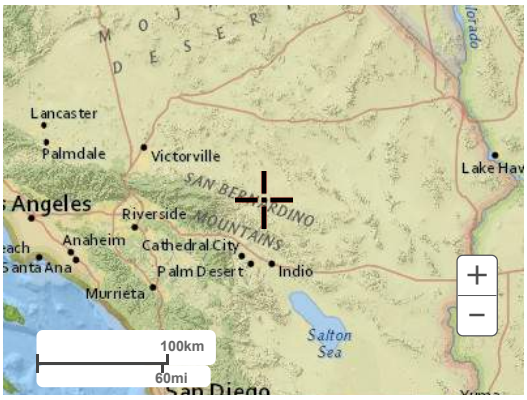
Back to Top

Maps & aerials

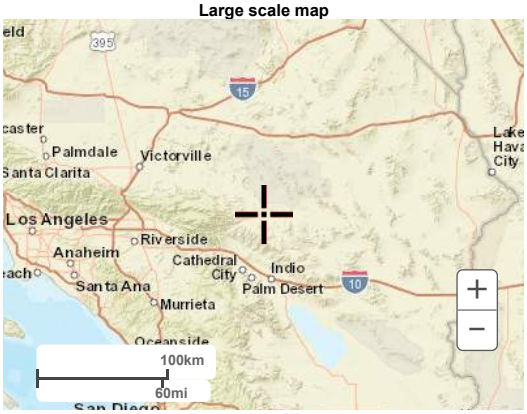
Small scale terrain



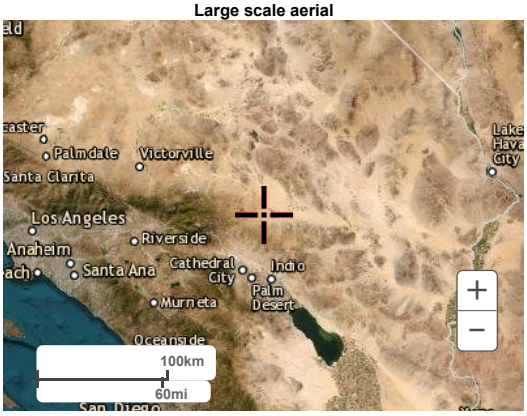
Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

R1W | R2W | R3W

T4N T3N T2N T1N T1S

SOURCE: GEOLOGY MAP

SOURCE: 1970 SCS SURVEY

SOURCE: 1970 SCS SURVEY

SOURCE: GEOLOGY MAP

SOURCE: GEOLOGY MAP

SOURCE: 1970 SCS SURVEY

SOURCE: 1970 SCS SURVEY

SOURCE: 1970 SCS SURVEY

SOURCE: GEOLOGY MAP

SOURCE: 1970 SCS SURVEY

SOURCE: GEOLOGY MAP

SOURCE: 1970 SCS SURVEY

PROJECT SITE
SOIL GROUP B

LEGEND

SOIL GROUP BOUNDARY

A SOIL GROUP DESIGNATION

BOUNDARY OF INDICATED SOURCE

INDEX MAP

Scale 1:250,000

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS
TRANSVERSE MERCATOR PROJECTION
BLACK NUMBERED LINES INDICATE THE 10,000 METER UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 11
1985 MAGNETIC DECLINATION FROM TRUE NORTH VARIES FROM 15½° (280 MILS) EASTERLY FOR THE CENTER OF THE WEST EDGE TO 16° (270 MILS) EASTERLY FOR THE CENTER OF THE EAST EDGE

BASE MAP REPRODUCED FROM U.S.G.S. "SAN BERNARDINO" TOPOGRAPHIC MAP

SCALE REDUCED BY 1/2

LOCATION DIAGRAM

SAN BERNARDINO COUNTY

HYDROLOGY MANUAL

HYDROLOGIC SOILS GROUP MAP FOR SOUTHCENTRAL AREA

FIGURE C-11

Figure ADD-1
Antecedent Moisture Condition (AMC)

5-day Rainfall - NOAA Atlas 14
(50% of Total Rainfall Prior to Peak)*

*1/2 (11-day - 1-day) =
1/2 (([10-day] + (1/10 ([20-day] - [10-day]))) - [1-day])

5 0 5 10 15
Miles

N
W E
S

Growing Season
- AMC I
- AMC II
- AMC III

SITE
AMC I

Curve (1) Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land) EXISTING		78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.) PROPOSED	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		77	86	91	94

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

CURVE NUMBERS FOR PERVIOUS AREAS

Figure C-3 (1 of 2)

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent (2)
Natural or Agriculture	0 - 0	0
Public Park	10 - 25	15
School	30 - 50	40
Single Family Residential: (3)		
2.5 acre lots	5 - 15	10
1 acre lots	10 - 25	20
2 dwellings/acre	20 - 40	30
3-4 dwellings/acre	30 - 50	40
5-7 dwellings/acre	35 - 55	50
8-10 dwellings/acre	50 - 70	60
More than 10 dwellings/acre	65 - 90	80
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 - 100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area shall always be made, and a review of aerial photos, where available, may assist in estimating the percentage of impervious cover in developed areas.

3. For typical equestrian subdivisions increase impervious area 5 percent over the values recommended in the table above.

SAN BERNARDINO COUNTY
HYDROLOGY MANUAL

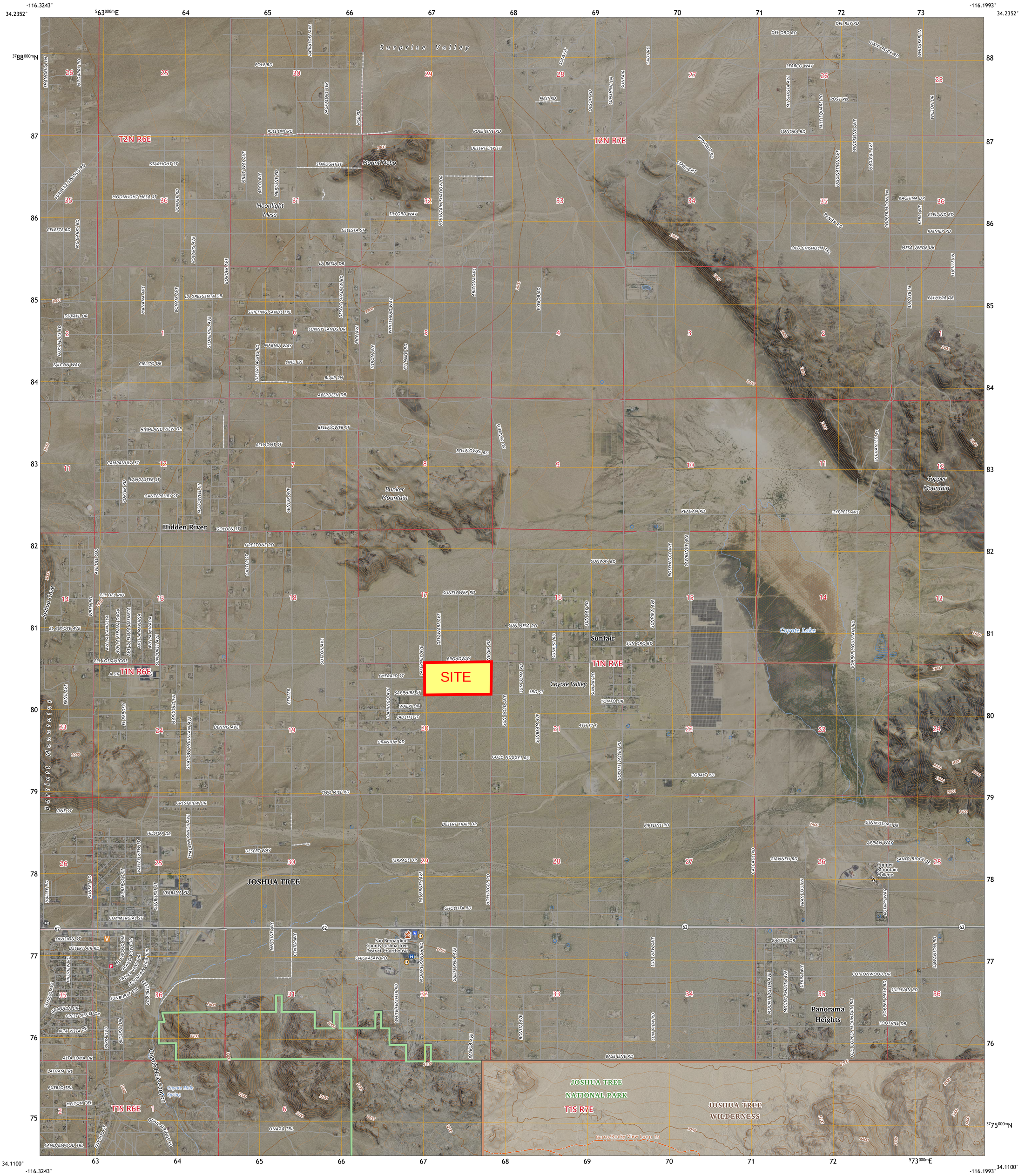
ACTUAL IMPERVIOUS COVER FOR DEVELOPED AREAS

Figure C-4

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
OnDemand Topo

7.5-MINUTE TOPO QUADRANGLE
Custom Extent
7.5-MINUTE TOPO

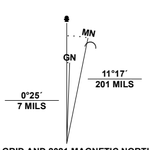


Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 11S

Data is provided by The National Map (TNM), is the best available at the time of map generation, and includes data content from supporting themes of Elevation, Hydrography, Geographic Names, Boundaries, Transportation, Structures, Land Cover, and Orthoimagery. Refer to associated Federal Geographic Data Committee (FGDC) Metadata for additional source data information.

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands. Temporal changes may have occurred since these data were collected and some data may no longer represent actual surface conditions.

Learn About The National Map: https://nationalmap.gov



UTM GRID AND 2021 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

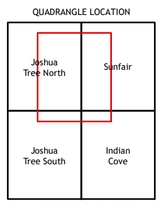
U.S. National Grid
100,000 - m Square ID
NT
Grid Zone Designation
11S

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 40 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
CONTOUR SMOOTHNESS = Medium

QUADRANGLE LOCATION



ADJOINING QUADRANGLES

ROAD CLASSIFICATION

Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

7.5-MINUTE TOPO, CA
2024

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11 North. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the San Bernardino County ISD GIS Department, United States Geological Survey, the Bureau of Land Management, the United States Department of Agriculture, and the National Geodetic Survey. The imagery was flown by U.S. Department of Agriculture Farm Sevice Agency in 2012 and was produced with a 1-meter ground sampling distance.

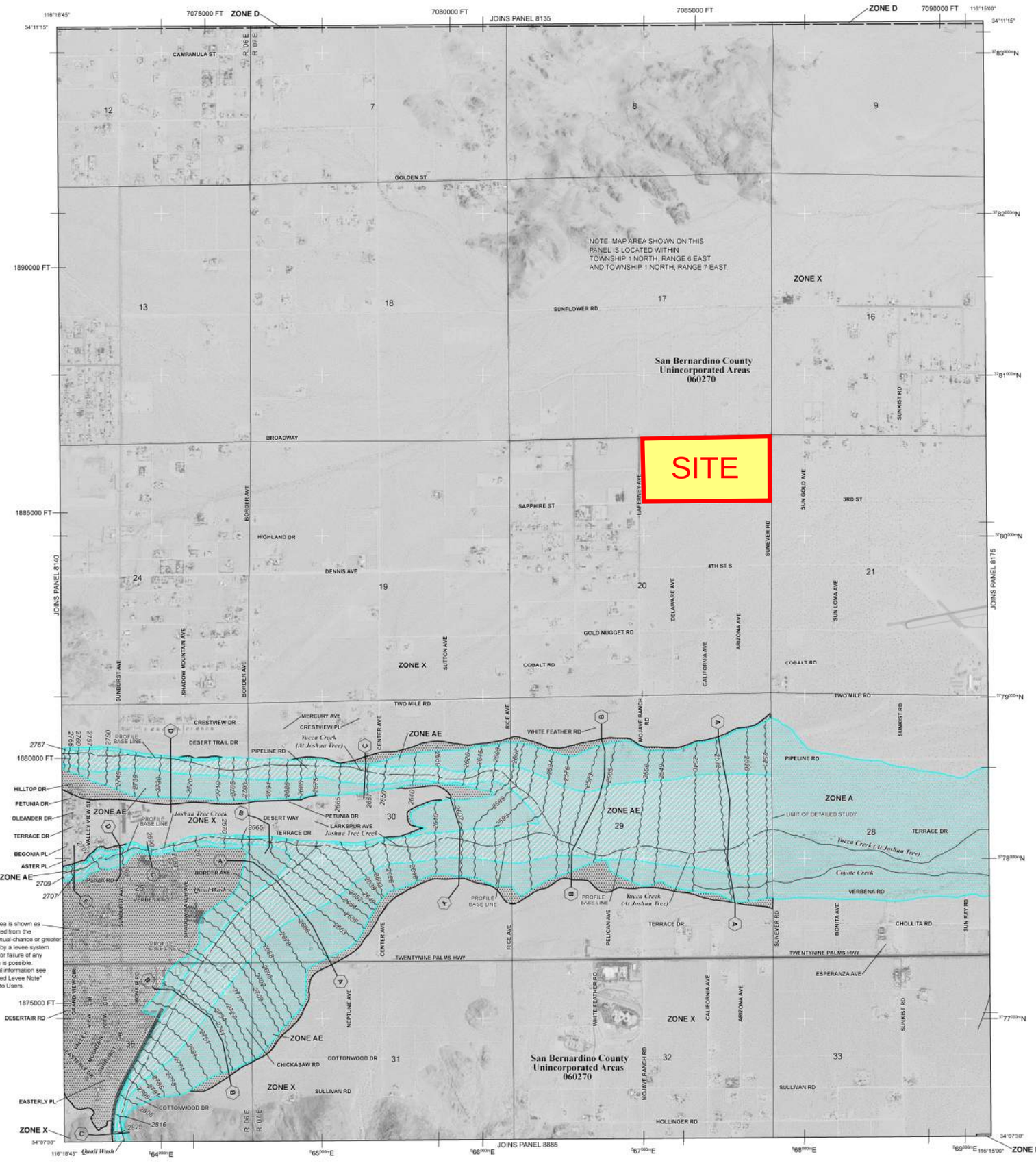
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

ACCREDITED LEVEE NOTES TO USERS: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA website at http://www.fema.gov/business/nfip/index.shtm.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4°75'000"E — 1000-meter Universal Transverse Mercator grid values, zone 11
- 6000000 FT — 5000-foot grid ticks: California State Plane coordinate system, Zone V (FIPSZONE = 405), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
September 2, 2016 – to change Base Flood Elevations, to add Base Flood Elevations, to change Special Flood Hazard Areas, to add Special Flood Hazard Areas, to change zone designations, to incorporate previously issued Letters of Map Revision, and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 8145J

FIRM

FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 8145 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN BERNARDINO COUNTY	060270	8145	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06071C8145J

MAP REVISED
SEPTEMBER 2, 2016

Federal Emergency Management Agency

MOJAVE RIVER WATERSHED

Final Water Quality Management Plan

For:

Joshua Tree Estates

TENTATIVE TRACT NO. 20668

Prepared for:

J.T. Santori Villa, LLC

1751 Colorado Blvd. #333

Los Angeles, CA 90041

626-673-2672

Prepared by:

Adkan Engineers

6879 Airport Drive

Riverside, CA 92504

(951) 688-0241

Submittal Date: 09/15/25

Revision Date: _____

Revision Date: _____

Revision Date: _____

Revision Date: _____

Revision Date: _____

Approval Date:_____

Project Owner's Certification

This Mojave River Watershed Water Quality Management Plan (WQMP) has been prepared for J.T. Santori Villa, LLC by Adkan Engineers. The WQMP is intended to comply with the requirements of the County of San Bernardino and the Phase II Small MS_4 General for the Mojave River Watershed. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the Phase II Small MS_4 Permit and the intent of the NPDES Permit for San Bernardino County (unincorporated aeras of Phelan, Oak Hills, Spring Valley Lake and Victorville) and the incorporated cities of Hesperia and Victorville and the Town of Apple Valley.. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

"I certify under a penalty of law that the provisions (implementation, operation, maintenance, and funding) of the WQMP have been accepted and that the plan will be transferred to future successors."

Project Data			
Permit/Application Number(s):		Grading Permit Number(s):	
Tract/Parcel Map Number(s):	20668	Building Permit Number(s):	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 0605-051-01

Owner's Signature			
Owner Name: Kim Chen			
Title			
Company	J.T. Santori Villa, LLC		
Address	1751 Colorado Blvd., #333		
Email	kim@homeparadiserg.com		
Telephone #	(626) 673-2672		
Signature		Date	

Preparer's Certification

Project Data			
Permit/Application Number(s):		Grading Permit Number(s):	
Tract/Parcel Map Number(s):	20668	Building Permit Number(s):	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN: 0605-051-01

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. 2013-001-DWQ."

Engineer: Richard Reaves		PE Stamp Below
Title	Senior Project Manager	
Company	Adkan Engineers	
Address	6879 Airport Drive	
Email	Rreaves@adkan.com	
Telephone #	(951) 688-0241	
Signature		
Date	09/15/25	

Table of Contents

Section I Introduction

Section 1 Discretionary Permits 1-2

Section 2 Project Description 2-1

2.1 Project Information 2-1
2.1 Project Sizing Categorization 2-1
2.2 Property Ownership / Management 2-2
2.3 Potential Stormwater Pollutants 2-3

Section 3 Site and Watershed Description 3-1

Section 4 Best Management Practices 4-1

4.1 Source Control BMP and Site Design BMP Measures 4-1
4.1.1 Source Control BMPs 4-1
4.1.2 Site Design BMPs 4-6
4.2 Treatment BMPs 4-8
4.2.1 Project Specific Hydrology Characterization 4-8
4.3 BMP Selection and Sizing 4-13
4.3.1 Exceptions to Requirements for Bioretention Facilities 4-14
4.3.2 Site Design BMP 4-16
4.3.3 Infiltration BMP 4-18
4.3.3.1 Allowed Variations for Special Site Conditions 4-18
4.3.4 Biotreatment BMP 4.20
4.3.5 Conformance Summary 4-24
4.3.6 Hydromodification Control BMP 4-25
4.4 Alternative Compliance Plan (if applicable) 4-26

Section 5 Inspection & Maintenance Responsibility Post Construction BMPs 5-1

Section 6 Site Plan and Drainage Plan 6-1

6.1. Site Plan and Drainage Plan 6-1
6.2 Electronic Data Submittal 6-1
6.3. Post Construction 6-1
6.4 Other Supporting Documentation 6-1

Forms

Form 1-1 Project Information 1-2
Form 2.1-1 Description of Proposed Project 2-1
Form 2.2-1 Property Ownership/Management 2-2
Form 2.3-1 Pollutants of Concern 2-3
Form 2.4-1 Water Quality Credits 2-4
Form 3-1 Site Location and Hydrologic Features 3-1
Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 3-2
Form 3-3 Watershed Description 3-4
Form 4.1-1 Non-Structural Source Control BMP 4-2
Form 4.1-2 Structural Source Control BMP 4-4

Form 4.1-3 Site Design Practices Checklist 4-6
Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume 4-8
Form 4.2-2 Summary of Hydromodification Assessment 4-9
Form 4.2-3 Hydromodification Assessment for Runoff Volume 4-10
Form 4.2-4 Hydromodification Assessment for Time of Concentration 4-11
Form 4.2-5 Hydromodification Assessment for Peak Runoff 4-12
Form 4.3-1 Infiltration BMP Feasibility 4-15
Form 4.3-2 Site Design BMPs 4-16
Form 4.3-3 Infiltration LID BMP 4-19
Form 4.3-4 Selection and Evaluation of Biotreatment BMP 4-20
Form 4.3-5 Volume Based Biotreatment – Bioretention and Planter Boxes w/Underdrains 4-21
Form 4.3-6 Volume Based Biotreatment- Constructed Wetlands and Extended Detention 4-22
Form 4.3-7 Flow Based Biotreatment 4-23
Form 4.3-8 Conformance Summary and Alternative Compliance Volume Estimate 4-24
Form 4.3-9 Hydromodification Control BMP 4-25
Form 5-1 BMP Inspection and Maintenance 5-1

Appendix A - Maps and Site Plans

Appendix B - BMP Design Details and Calculations

Appendix C – Educational Materials

Section I - Introduction

This WQMP template has been prepared specifically for the Phase II Small MS4 General Permit in the Mojave River Watershed. This location is within the jurisdiction of the Lahontan Regional Water Quality Control Board (LRWQCB). This document should not be confused with the WQMP template for the Santa Ana Phase I area of San Bernardino County.

WQMP preparers must refer to the MS4 Permit for the Mojave Watershed WQMP template and Technical Guidance (TGD) document found at: http://cms.sncounty.gov/dpw/Lnad/NPDES.aspx to find pertinent arid region and Mojave River Watershed specific references and requirements.

Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	Joshua Tree Estates				
Project Owner Contact Name:	Kim Chen				
Mailing Address:	1751 Colorado Blvd, #333 Los Angeles, CA 90041	E-mail Address:	kim@homeparadiserg.com	Telephone:	(626) 673-2672
Permit/Application Number(s):		Tract/Parcel Map Number(s):	20668		
Additional Information/ Comments:					
Description of Project:	The project site is located at the southeast corner of East Broadway and Laferney Avenue. The project site is bounded by Laferney Avenue to the west, East Broadway to the north, Sunever Road to the east, and Sapphire Street to the south. The project is proposing 32 single-family residential lots on approximately 81.2 acres of undeveloped land. Existing elevations across the site vary from 2466' at the northeast corner to 2518' at the southwest corner (NAVD88 datum). The existing drainage pattern for the site is characterized by sheet flows that follow the slope to the northeast. The site is traversed by various unnamed ephemeral streambeds, all of which flow from the southwesterly direction toward the northeast. All flows in this area are ultimately conveyed to the Sunfair Dry Lakebed, a basin with no outlet, lying approximately 3.5 miles northeasterly from the subject property. The project site is impacted by offsite flows conveyed through 4 ephemeral streambeds running more or less parallel to each other from the southwest toward the northeast. Onsite streets will collect flows and direct them to the northeast corner of the site at East Broadway and Sunever Road via a series of culverts connecting a trapezoidal channel along East Broadway. Individual lot flows will be captured in an infiltration trench on each lot, which will be privately owned and maintained.				

Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	

Section 2 Project Description

2.1 Project Information

The WQMP shall provide the information listed below. The information provided for Conceptual/ Preliminary WQMP should give sufficient detail to identify the major proposed site design and LID BMPs and other anticipated water quality features that impact site planning. Final Project WQMP must specifically identify all BMP incorporated into the final site design and provide other detailed information as described herein.

The purpose of this information is to help determine the applicable development category, pollutants of concern, watershed description, and long term maintenance responsibilities for the project, and any applicable water quality credits. This information will be used in conjunction with the information in Section 3, Site Description, to establish the performance criteria and to select the LID BMP or other BMP for the project or other alternative programs that the project will participate in, which are described in Section 4.

2.1.1 Project Sizing Categorization

If the Project is greater that 5,000 square feet, and not on the excluded list as found on Section 1.4 of the TGD, the Project is a Regulated Development Project.

If the Project is creating and/or replacing greater that 2,500 square feet but less than 5,000 square feet of impervious surface area, then it is considered a Site Design Only project. This criterion is applicable to all development types including detached single family homes that create and/or replace greater than 2,500 square feet of impervious area and are not part of a larger plan of development.

Form 2.1-1 Description of Proposed Project

1 Development Category (Select all that apply):

☒ #1 New development involving the creation of 10,000 ft^2 or more of impervious surface collectively over entire site	☐ #2 Significant re-development involving the addition or replacement of 5,000 ft^2 or more of impervious surface on an already developed site	☐ #3 Road Project – any road, sidewalk, or bicycle lane project that creates greater that 5,000 square feet of contiguous impervious surface	☐ #4 LUPs – linear underground/overhead projects that has a discrete location with 5,000 sq. ft. or more new constructed impervious surface

☐ Site Design Only (Project Total Square Feet > 2,500 but < 5,000 sq.ft.) *Will require source control Site Design Measures. Use the "PCMP" Template. Do not use this WQMP Template*

2 Project Area (ft2):	3,526,181	**3** Number of Dwelling Units:	32	**4** SIC Code:	

5 Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

2.2 Property Ownership/Management

Describe the ownership/management of all portions of the project and site. State whether any infrastructure will transfer to public agencies (City, County, Caltrans, etc.) after project completion. State if a homeowners or property owners association will be formed and be responsible for the long-term maintenance of project stormwater facilities. Describe any lot-level stormwater features that will be the responsibility of individual property owners.

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

The infiltration trenches on each lot will be privately owned and maintained by each lot owner. Cross-lot drainage exists and will remain after public improvements are made. Each lot owner will agree to accept runoff from the adjacent property so long as the location of the flow or concentrated runoff is not altered. Each lot owner shall agree not to alter the quantity or quality of the runoff from their lot onto the adjacent property. No lot grading will occur as an improvement of this development. Each lot owner will be responsible for their own grading, swales, and runoff mitigation.

2.3 Potential Stormwater Pollutants

Best Management Practices (BMP) measures for pollutant generating activities and sources shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment (or an equivalent manual). Pollutant generating activities must be considered when determining the overall pollutants of concern for the Project as presented in Form 2.3-1.

Determine and describe expected stormwater pollutants of concern based on land uses and site activities (refer to Table 3-2 in the TGD for WQMP).

Form 2.3-1 Pollutants of Concern

Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	Runoff from landscaped areas can bring pathogens.
Nutrients - Phosphorous	E ☒	N ☐	Runoff from landscaped areas can bring nutrients including phosphorous.
Nutrients - Nitrogen	E ☒	N ☐	Runoff from landscaped areas can bring nutrients including nitrogen.
Noxious Aquatic Plants	E ☐	N ☒	Noxious aquatic plants are not anticipated as part of this project
Sediment	E ☒	N ☐	Runoff along pervious areas can erode slopes and carry sediment.
Metals	E ☐	N ☒	Metals are not anticipated as part of this project.
Oil and Grease	E ☒	N ☐	The primary source of oil and grease would come from vehicular traffic.
Trash/Debris	E ☒	N ☐	Trash is expected given the land use.
Pesticides / Herbicides	E ☒	N ☐	Runoff from landscaped areas can bring with it pesticides and herbicides.
Organic Compounds	E ☐	N ☒	Site does not contain existing landscaping.
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

Section 3 Site and Watershed Description

Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and sub-watershed DMAs) is conveyed to the site outlet(s). Refer to Section 3.2 in the TGD for WQMP. The form below is provided as an example. Then complete Forms 3.2 and 3.3 for each DA on the project site. ***If the project has more than one drainage area for stormwater management, then complete additional versions of these forms for each DA / outlet. A map presenting the DMAs must be included as an appendix to the WQMP document.***

Form 3-1 Site Location and Hydrologic Features

Site coordinates *take GPS measurement at approximate center of site*	Latitude 34.162826	Longitude -116.268940	Thomas Bros Map page 4889
1 San Bernardino County climatic region: ☒ Desert			
2 Does the site have more than one drainage area (DA): Yes☐ No☒ *If no, proceed to Form 3-2. If yes, then use this form to show a conceptual schematic describing DMAs and hydrologic feature connecting DMAs to the site outlet(s). An example is provided below that can be modified for proposed project or a drawing clearly showing DMA and flow routing may be attached*			

Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA
DA1 DMA C flows to DA1 DMA A	*Ex. Bioretention overflow to vegetated bioswale with 4' bottom width, 5:1 side slopes and bed slope of 0.01. Conveys runoff for 1000' through DMA 1 to existing catch basin on SE corner of property*
DA1 DMA A to Outlet 1	Runoff on each lot will be captured and mitigated via use of an infiltration trench on each individual lot. Runoff in the proposed streets will flow towards East Broadway, where it will be conveyed by a series of culverts connecting a trapezoidal channel that flows to the northeast corner of the site at East Broadway and Sunever Road before flowing offsite.
DA1 DMA B to Outlet 1	
DA2 to Outlet 2	

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A	DMA B	DMA C	DMA D
1 DMA drainage area (ft^2)	3,526,181			
2 Existing site impervious area (ft^2)	28,750			
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	1			
4 Hydrologic soil group *Refer to County Hydrology Manual Addendum for Arid Regions – http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf*	B			
5 Longest flowpath length (ft)	8,686 ft			
6 Longest flowpath slope (ft/ft)	0.019 ft/ft			
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*	Barren			
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Poor			

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 (use only as needed for additional DMA w/in DA 1)				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA E	DMA F	DMA G	DMA H
1 DMA drainage area (ft^2)				
2 Existing site impervious area (ft^2)				
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*				
4 Hydrologic soil group *Refer to County Hydrology Manual Addendum for Arid Regions – http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf*				
5 Longest flowpath length (ft)				
6 Longest flowpath slope (ft/ft)				
7 Current land cover type(s) *Select from Fig C-3 of Hydrology Manual*				
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*				

Form 3-3 Watershed Description for Drainage Area

Receiving waters *Refer to Watershed Mapping Tool - http://permitrack.sbcounty.gov/wap/ See 'Drainage Facilities" link at this website*	Santa Ana River Reach 5, Reach 4, Reach 3 and Prado Basin
Applicable TMDLs *Refer to Local Implementation Plan*	Santa Ana River Reach 4 – pathogens Santa Ana River Reach 3 – pathogens/metals
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website – http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	None for immediate receiving waters Santa Ana River Reach 4 – pathogens Santa Ana River Reach 3 – pathogens/metals
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	None
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	Santa Ana River Reach 5, Reach 4, Reach 3
Hydrologic Conditions of Concern	☒ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☐ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP and Site Design BMP Measures

The information and date in this section are required for both Regulated Development and Site Design Only Projects. Source Control BMPs and Site Design BMP Measures are the basis of site-specific pollution management.

4.1.1 Source Control BMPs

Non-structural and structural source control BMP are required to be incorporated into all new development and significant redevelopment projects. Form 4.1-1 and 4.1-2 are used to describe specific source control BMPs used in the WQMP or to explain why a certain BMP is not applicable. Table 7-3 of the TGD for WQMP provides a list of applicable source control BMP for projects with specific types of potential pollutant sources or activities. The source control BMP in this table must be implemented for projects with these specific types of potential pollutant sources or activities.

The preparers of this WQMP have reviewed the source control BMP requirements for new development and significant redevelopment projects. The preparers have also reviewed the specific BMP required for project as specified in Forms 4.1-1 and 4.1-2. All applicable non-structural and structural source control BMP shall be implemented in the project.

The identified list of source control BMPs correspond to the CASQA Stormwater BMP Handbook for New Development and Redevelopment.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	Practical educational materials will be provided to the first property owners/tenants outlining general housekeeping practices that contribute to the protection of stormwater quality. Afterward, such materials will then be available through the local jurisdiction's stormwater education program.
N2	Activity Restrictions	☒	☐	CCRs will be prepared by the developer to restrict activities that may have an adverse impact on stormwater quality. Vehicle washing will be prohibited outside of designated car washing facilities. When using pesticides, contact licensed pesticide applicator to do the application.
N3	Landscape Management BMPs	☒	☐	Property owners/tenants/occupants will follow all federal, state and local laws and regulations governing the use, storage and disposal of fertilizers and pesticides and training of applicators and pest control advisors. Pesticide application will only be performed under the supervision of a California qualified pesticide applicator.
N4	BMP Maintenance	☒	☐	Implementation of non-structural BMPs and maintenance of structural BMPs will be the responsibility of each individual lot owner.
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	No hazardous waste will be stored on the site.
N6	Local Water Quality Ordinances	☒	☐	Property owners/tenants/occupants will be informed that compliance with all applicable local water quality ordinances is required and will be completed through this WQMP.
N7	Spill Contingency Plan	☐	☒	Proposed project is a residential development; spill contingency plan is not applicable
N8	Underground Storage Tank Compliance	☐	☒	No underground storage tanks on this project.
N9	Hazardous Materials Disclosure Compliance	☐	☒	No hazardous materials will be stored on the site.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	Property owners/tenants/occupants will be informed that compliance with Article 80 of the Uniform Fire Code is required.
N11	Litter/Debris Control Program	☒	☐	Property owner shall implement trash management and litter control procedures aimed at reducing pollution of drainage water.Site inspection will occur daily and during landscape maintenance. Trash will be cleaned as needed.
N12	Employee Training	☐	☒	Individual lot owners will be responsible for maintaining their own BMP's; employee training is not applicable.
N13	Housekeeping of Loading Docks	☐	☒	Site does not have loading docks.
N14	Catch Basin Inspection Program	☐	☒	No catch basins are being proposed.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	Vacuum sweeping of parking lots will be performed on an annual basis at minimum prior to the start of the rainy season or as required by the local jurisdiction.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	No other applicable non-structural measures for this project exist at this time. Site is not a public agency project.
N17	Comply with all other applicable NPDES permits	☐	☒	Property owner will comply with other NPDES permits to include BMPs that are required as part of a SWPPP.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stencilling and signage (CASQA New Development BMP Handbook SD-13)	☐	☒	Catch basins are not being proposed on this project.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	No outdoor areas for storage of materials are being proposed.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☐	☒	Trash enclosures are not being proposed.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (Statewide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	Landscape design will include water efficient plant pallettes and efficient irrigation systems recommended by a landscape architect to minimize excess irrigation and irrigation runoff.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscape pockets, fingers, setback areas, etc. will have a finished grade 1-2 inches below top of curb to increase retention and infiltration of stormwater and irrigation water.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☒	☐	All graded slopes will be designed to safely convey runoff from top of slope. All slopes will be planted to further prevent erosion. Energy dissipation will be installed as needed.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☐	☒	Loading docks are not being proposed on this project.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	No repair/mainenance bays are proposed as part of this specific project.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	Vehicle washing is not allowed onsite as part of this project.
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	No outdoor processing areas are proposed as part of this specific project.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	No outdoor equipment/accessory washing areas are proposed as part of this specific project.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	☐	☒	No fuel dispensing areas are proposed as part of this specific project.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☐	☒	No hillside areas will be disturbed during development activities for this specific project.
S14	Wash water control for food preparation areas	☐	☒	Project is not a food establishments entity.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☐	☒	No community car wash facilities are proposed as part of this specific project.

4.1.2 Site Design BMPs

As part of the planning phase of a project, the site design practices associated with new LID requirements in the Phase II Small MS4 Permit must be considered. Site design BMP measures can result in smaller Design Capture Volume (DCV) to be managed by both LID and hydromodification control BMPs by reducing runoff generation.

As is stated in the Permit, it is necessary to evaluate site conditions such as soil type(s), existing vegetation and flow paths will influence the overall site design.

Describe site design and drainage plan including:

- A narrative of site design practices utilized or rationale for not using practices
- A narrative of how site plan incorporates preventive site design practices
- Include an attached Site Plan layout which shows how preventative site design practices are included in WQMP

Refer to Section 5.2 of the TGD for WQMP for more details.

Form 4.1-3 Site Design Practices Checklist

Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☒ No ☐ Explanation: Lots will be approximately 65% impervious.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: Lots will remain mostly undeveloped with the exception of the pad. Infiltration trenches will be utilized on each graded pad to capture and infiltrate flows from the lots.
Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐ Explanation: Site grading will be designed to mimic natural pre-development drainage patterns, which drain to the northeast corner of the site.
Disconnect impervious areas. Including rerouting of rooftop drainage pipes to drain stormwater to storage or infiltration BMPs instead of to storm drain: Yes ☒ No ☐ Explanation: Runoff on lots will drain to the infiltration trenches on each lot.
Use of Porous Pavement: Yes ☐ No ☒ Explanation: No porous pavement is being proposed.
Protect existing vegetation and sensitive areas: Yes ☒ No ☐ Explanation: Existing site is barren and lots will remain undeveloped with the exception of the pad. Existing vegetation and Joshua Trees will remain undisturbed in the undeveloped portions of the site.
Re-vegetate disturbed areas: Yes ☐ No ☒ Explanation: Disturbed areas will be graded and landscaped per the landscaping plan for the project.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐ Explanation: The compaction in the proposed infiltration trenches will be per soil engineer's recommendations.

Utilize naturalized/rock-lined drainage swales in place of underground piping or imperviously lined swales: Yes ☐ No ☒ Explanation: No swales are being proposed on this project.
Stake off areas that will be used for landscaping to minimize compaction during construction: Yes ☒ No ☐ Explanation: Graded areas of landscape will be staked off to reduce compaction.
Use of Rain Barrels and Cisterns, Including the use of on-site water collection systems : Yes ☐ No ☒ Explanation: No rain barrels or cisterns are being proposed on this project.
Stream Setbacks. Includes a specified distance from an adjacent stream: Yes ☐ No ☒ Explanation: No adjacent streams.

It is noted that, in the Phase II Small MS4 Permit, site design elements for green roofs and vegetative swales are required. Due to the local climatology in the Mojave River Watershed, proactive measures are taken to maximize the amount of drought tolerant vegetation. It is not practical in this region to have green roofs or vegetatice swales. As part of site design the project proponent should utilize locally recommended vegetation types for landscaping. Typical landscaping recommendations are found in following local references:

San Bernardino County Special Districts:

Guide to High Desert Landscaping –

http://www.specialdistricts.org/modules/showdocument.aspx?documentid=795

Recommended High-Desert Plants –

http://www.specialdistricts.org/modules/showdocument.aspx?documentid=553

Mojave Water Agency:

Desert Ranch: http://www.mojavewater.org/files/desertranchgardenprototype.pdf

Summertree: http://www.mojavewater.org/files/Summertree-Native-Plant-Brochure.pdf

Thornless Garden: http://www.mojavewater.org/files/thornlessgardenprotoype.pdf

Mediterranean Garden: http://www.mojavewater.org/files/mediterraneangardenprototype.pdf

Lush and Efficient Garden: http://www.mojavewater.org/files/lushandefficientgardenprototype.pdf

Alliance for Water Awareness and Conservation (AWAC) outdoor tips – http://hdawac.org/save-outdoors.html

4.2 Treatment BMPs

After implementation and design of both Source Control BMPs and Site Design BMP measures, and remaning runoff from impervious DMAs must be directed to one or more on-site, treatment BMPs (LID or biotreatment) designed to infiltrate, evaportranspire, and/or bioretain the amount of runoff specified in Permit Section E.12.e(ii)© Numeric Sizing Criteria for Storm Water Retention and Treatment.

4.2.1 Project Specific Hydrology Characterization

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in Section E.12.e.ii.c and Section E.12.f of the Phase II Small MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection from hydromodification.

If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.

It is noted that in the Phase II Small MS4 Permit jurisdictions, the LID BMP Design Capture Volume criteria is based on the 2-year rain event. The hydromodification performance criterion is based on the 10-year rain event.

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), San Bernardino County requires use of the P_6 method (Form 4.2-1) For pre- and post-development hydrologic calculation, San Bernardino County requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi²), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for hydromodification performance criteria.

Refer to Section 4 in the TGD for WQMP for detailed guidance and instructions.

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 1)

1 Project area DA 1 (ft²): 3,526,181	**2** Imperviousness after applying preventative site design practices (Imp%):	**3** Runoff Coefficient (Rc): $R_c = 0.858(Imp\%)^{\wedge 3} - 0.78(Imp\%)^{\wedge 2} + 0.774(Imp\%) + 0.04$
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Desert = 1.2371)		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times*		24-hrs ☐ 48-hrs ☒

reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.	
7 Compute design capture volume, DCV (ft^3): 174,240 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*	

Form 4.2-2 Summary of Hydromodification Assessment (DA 1)

Is the change in post- and pre- condition flows captured on-site?: Yes ☒ No ☐

If "Yes", then complete Hydromodification assessment of site hydrology for 10yr storm event using Forms 4.2-3 through 4.2-5 and insert results below *(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual- Addendum 1)*

If "No," then proceed to Section 4.3 BMP Selection and Sizing

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	**1** 835,915 *Form 4.2-3 Item 12*	**2** 41.33 *Form 4.2-4 Item 13*	**3** 337.07 *Form 4.2-5 Item 10*
Post-developed	**4** 1,010,590 *Form 4.2-3 Item 13*	**5** 40.23 *Form 4.2-4 Item 14*	**6** 418.62 *Form 4.2-5 Item 14*
Difference	**7** *174,675* *Item 4 – Item 1*	**8** *1.1* *Item 2 – Item 5*	**9** *81.55* *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** 20.9% *Item 7 / Item 1*	**11** 2.7% *Item 8 / Item 2*	**12** 24.2% *Item 9 / Item 3*

See drainage study in Appendix A

Form 4.2-3 Hydromodification Assessment for Runoff Volume (DA 1)

Weighted Curve Number Determination for: Pre-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1a Land Cover type								
2a Hydrologic Soil Group (HSG)								
3a DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								
Weighted Curve Number Determination for: Post-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1b Land Cover type								
2b Hydrologic Soil Group (HSG)								
3b DMA Area, ft^2 *sum of areas of DMA should equal area of DA*								
4b Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*								

5 Pre-Developed area-weighted CN:	**7** Pre-developed soil storage capacity, S (in): *S = (1000 / Item 5) - 10*	**9** Initial abstraction, I_a (in): *I_a = 0.2 * Item 7*
6 Post-Developed area-weighted CN:	**8** Post-developed soil storage capacity, S (in): *S = (1000 / Item 6) - 10*	**10** Initial abstraction, I_a (in): *I_a = 0.2 * Item 8*

11 Precipitation for 10 yr, 24 hr storm (in):
Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

12 Pre-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 9)^2 / ((Item 11 – Item 9 + Item 7)*

13 Post-developed Volume (ft^3):
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

14 Volume Reduction needed to meet HCOC Requirement, (ft^3):
*V_{HCOC} = (Item 13 * 0.95) – Item 12*

Form 4.2-4 Hydromodification Assessment for Time of Concentration (DA 1)

Compute time of concentration for pre and post developed conditions for each DA *(For projects using the Hydrology Manual complete the form below)*

Variables	Pre-developed DA1 *Use additional forms if there are more than 4 DMA*				Post-developed DA1 *Use additional forms if there are more than 4 DMA*			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
1 Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition*								
2 Change in elevation (ft)								
3 Slope (ft/ft), S_o *= Item 2 / Item 1*								
4 Land cover								
5 Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP*								
6 Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet*								
7 Cross-sectional area of channel (ft^2)								
8 Wetted perimeter of channel (ft)								
9 Manning's roughness of channel (n)								
10 Channel flow velocity (ft/sec) V_{fps} *= (1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5*								
11 Travel time to outlet (min) T_t *= Item 6 / (Item 10 * 60)*								
12 Total time of concentration (min) T_c *= Item 5 + Item 11*								
13 Pre-developed time of concentration (min): *Minimum of Item 12 pre-developed DMA*								
14 Post-developed time of concentration (min): *Minimum of Item 12 post-developed DMA*								
15 Additional time of concentration needed to meet HCOC requirement (min): $T_{C\text{-}HCOC}$ *= (Item 13 * 0.95) – Item 14*								

Form 4.2-5 Hydromodification Assessment for Peak Runoff (DA 1)

Compute peak runoff for pre- and post-developed conditions

Variables		Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*			Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)*							
2 Drainage Area of each DMA (Acres) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
3 Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
4 Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*							
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted F_m from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*							
6 Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	DMA A	*n/a*			*n/a*		
	DMA B		*n/a*			*n/a*	
	DMA C			*n/a*			*n/a*

8 Pre-developed Q_p at T_c for DMA A: *Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAA/2}$] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAA/3}$]*	**9** Pre-developed Q_p at T_c for DMA B: *Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAB/1}$] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAB/3}$]*	**10** Pre-developed Q_p at T_c for DMA C: *Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAC/1}$] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAC/2}$]*
10 Peak runoff from pre-developed condition confluence analysis (cfs): *Maximum of Item 8, 9, and 10 (including additional forms as needed)*		
11 Post-developed Q_p at T_c for DMA A: *Same as Item 8 for post-developed values*	**12** Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	**13** Post-developed Q_p at T_c for DMA C: *Same as Item 10 for post-developed values*
14 Peak runoff from post-developed condition confluence analysis (cfs): *Maximum of Item 11, 12, and 13 (including additional forms as needed)*		
15 Peak runoff reduction needed to meet HCOC Requirement (cfs): $Q_{p\text{-}HCOC}$ = *(Item 14 * 0.95) – Item 10*		

4.3 BMP Selection and Sizing

Complete the following forms for each project site DA to document that the proposed treatment (LID/Bioretention) BMPs conform to the project DCV developed to meet performance criteria specified in the Phase II Small MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the Phase II Small MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Biotreatment (Form 4.3-4).

> Please note that the selected BMPs may also be used as dual purpose for on-site, hydromodification mitigation and management.

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.

The first step in the analysis, using Section 5.3.2 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is "Yes," provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.

Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable Site Design BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.

If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable Site Design BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.

If the combination of site design, retention and/or infiltration BMPs are unable to mitigate the entire DCV, then the remainder of the volume-based performance criteria that cannot be achieved with site design, retention and/or infiltration BMPs must be managed through biotreatment BMPs. If biotreatment BMPs are used, then they must be sized to provide equivalent effectiveness based on Template Section 4.3.4.

4.3.1 Exceptions to Requirements for Bioretention Facilities

Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following categories of Regulated Projects:

1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;

2) facilities receiving runoff solely from existing (pre-project) impervious areas; and

3) Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒
Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☒
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☐ No ☒
If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.
If no, then proceed to Item 9, below.

[9] All answers to Item 1 through Item 6 are "No":
Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.
Proceed to Form 4.3-2, Hydrologic Source Control BMP.

4.3.2 Site Design BMP

Section E.12.e of the Small Phase II MS4 Permit emphasizes the use of LID preventative measures; and the use of Site Design Measures reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable site Design Measures shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of Site Design BMPs. If a project cannot feasibly meet BMP sizing requirements or cannot fully address hydromodification, feasibility of all applicable Site Design BMPs must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design BMP. Refer to Section 5.4 in the TGD for more detailed guidance.

Form 4.3-2 Site Design BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☐ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)			
3 Ratio of pervious area receiving runoff to impervious area			
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*			
5 Sum of retention volume achieved from impervious area dispersion (ft^3): *$V_{retention}$ =Sum of Item 4 for all BMPs*			
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☐ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) *$V_{retention}$ = (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3): *$V_{retention}$ =Sum of Item 12 for all BMPs*			

Form 4.3-2 Site Design BMPs (DA 1)

Form 4.3-2 cont. Site Design BMPs (DA 1)

21 Implementation of Street Trees: Yes ☐ No ☐ *If yes, complete Items 22-25. If no, proceed to Item 26*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees			
23 Average canopy cover over impervious area (ft^2)			
24 Runoff volume retention from street trees (ft^3) *$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*			
25 Runoff volume retention from street tree BMPs (ft^3): *$V_{retention}$ = Sum of Item 24 for all BMPs*			
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs: *Sum of Items 5, 13, 20, 25 and 29*			

4.3.3 Infiltration BMPs

Use Form 4.3-3 to compute on-site retention of runoff from proposed retention and infiltration BMPs. Volume retention estimates are sensitive to the percolation rate used, which determines the amount of runoff that can be infiltrated within the specified drawdown time. The infiltration safety factor reduces field measured percolation to account for potential inaccuracy associated with field measurements, declining BMP performance over time, and compaction during construction. Appendix C of the TGD for WQMP provides guidance on estimating an appropriate safety factor to use in Form 4.3-3.

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5 of the TGD for WQMP)

If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

4.3.3.1 Allowed Variations for Special Site Conditions

The bioretention system design parameters of this Section may be adjusted for the following special site conditions:

1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.

2) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate and impervious liner and may located the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).

3) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

4) facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide adequate pretreatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with no chance of spill migration.

.

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 174,240 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA 1.4 BMP Type Infiltration Trench	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	3.0		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.0		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	1.5		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	1		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	0.5		
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	1690		
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	N/A		
10 Amended soil porosity	N/A		
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	6		
12 Gravel porosity	0.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3		
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	5535		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	N/A		

16 Total Retention Volume from LID Infiltration BMPs: 5535 cf * 32 lots = 177,112 cf *(Sum of Items 14 and 15 for all infiltration BMP*

17 Fraction of DCV achieved with infiltration BMP: 101% *Retention% = Item 16 / Form 4.2-1 Item 7*

18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐

If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).

Use Form 4.3-4 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-5 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-6 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-7 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-4 Selection and Evaluation of Biotreatment BMP (DA 1)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.*	
2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☐ Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft^3): *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*		
7 Metrics for MEP determination: • Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*		

Form 4.3-5 Volume Based Biotreatment (DA 1) – Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*			
2 Amended soil infiltration rate *Typical ~ 5.0*			
3 Amended soil infiltration safety factor *Typical ~ 2.0*			
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*			
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*			
8 Amended soil surface area (ft^2)			
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity, *n*			
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
12 Gravel porosity, *n*			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 1) – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	DA DMA BMP Type		DA DMA BMP Type *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft^2) A_{bottom} = *Item 2 * Item 3*				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft^2) $A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*				
8 Storage volume (ft^3) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details* V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]*				
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*				
10 Outflow rate (cfs) Q_{BMP} = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft^3) $V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : *(Sum of Item 12 for all BMP included in plan)*				

Form 4.3-7 Flow Based Biotreatment (DA 1)

Biotreatment BMP Type *Vegetated swale, vegetated filter strip, or other comparable proprietary BMP*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in TGD Table 5-5*			
2 Flow depth for water quality treatment (ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
3 Bed slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
4 Manning's roughness coefficient			
5 Bottom width (ft) b_w *= (Form 4.3-5 Item 6 * Item 4) / (1.49 * Item 2^1.67 * Item 3^0.5)*			
6 Side Slope (ft/ft) *BMP specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
7 Cross sectional area (ft^2) *A = (Item 5 * Item 2) + (Item 6 * Item 2^2)*			
8 Water quality flow velocity (ft/sec) *V = Form 4.3-5 Item 6 / Item 7*			
9 Hydraulic residence time (min) *Pollutant specific, see Table 5-6 of the TGD for WQMP for reference to BMP design details*			
10 Length of flow based BMP (ft) *L = Item 8 * Item 9 * 60*			
11 Water surface area at water quality flow depth (ft^2) SA_{top} *= (Item 5 + (2 * Item 2 * Item 6)) * Item 10*			

4.3.5 Conformance Summary

Complete Form 4.3-8 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV, and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-8 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

1 Total LID DCV for the Project DA-1 (ft^3): 174,240 *Copy Item 7 in Form 4.2-1*

2 On-site retention with site design hydrologic source control LID BMP (ft^3): *Copy Item 30 in Form 4.3-2*

3 On-site retention with LID infiltration BMP (ft^3): 177,112 *Copy Item 16 in Form 4.3-3*

4 On-site biotreatment with volume based biotreatment BMP (ft^3): *Copy Item 3 in Form 4.3-5*

5 Flow capacity provided by flow based biotreatment BMP (cfs): *Copy Item 6 in Form 4.3-5*

6 LID BMP performance criteria are achieved if answer to any of the following is "Yes":

- Full retention of LID DCV with site design HSC, infiltration, or harvest and use BMP: Yes ☒ No ☐
  If yes, sum of Items 2, 3, and 4 is greater than Item 1
- Combination of on-site retention BMPs for a portion of the LID DCV and volume-based biotreatment BMP that address all pollutants of concern for the remaining LID DCV: Yes ☐ No ☒
  If yes, a) sum of Items 2, 3, 4, and 5 is greater than Item 1, and Items 2, 3 and 4 are maximized; or b) Item 6 is greater than Form 4.3--5 Item 6 and Items 2, 3 and 4 are maximized
- On-site retention and infiltration is determined to be infeasible and biotreatment BMP provide biotreatment for all pollutants of concern for full LID DCV: Yes ☐ No ☒
  If yes, Form 4.3-1 Items 7 and 8 were both checked yes

7 If the LID DCV is not achieved by any of these means, then the project may be allowed to develop an alternative compliance plan. Check box that describes the scenario which caused the need for alternative compliance:

- Combination of Site Design, retention and infiltration, and biotreatment BMPs provide less than full LID DCV capture: ☐
  Checked yes for Form 4.3-4 Item 7, Form 4.3-4 Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- Facilities, or a combination of facilities, of a different design than in Section R.12.e.(ii)(f) may be permitted if all of the following Phase II Small MS4 General Permit 2013-0001-DWQ 55 February 5, 2013 measures of equivalent effectiveness are demonstrated:
  1) Equal or greater amount of runoff infiltrated or evapotranspired; ☐
  2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment; ☐
  3) Equal or greater protection against shock loadings and spills; ☐
  4) Equal or Greater accessibility and ease of inspection and maintenance. ☐

4.3.6 Hydromodification Control BMP

Use Form 4.3-9 to compute the remaining runoff volume retention, after Site Desiogn BMP are implemented, needed to address Hydromodification, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential hydromodification. Describe the proposed hydromodification treatment control BMP. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-9 Hydromodification Control BMPs (DA 1)

1 Volume reduction needed for hydromodification performance criteria (ft^3): 124,146 *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**2** On-site retention with site design and infiltration, BMP (ft^3): 177,112 *Sum of Form 4.3-8 Items 2, 3, and 4 Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving hydromodification volume reduction*
3 Remaining volume for hydromodification volume capture (ft^3): 0 *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site BMPs (ft^3): 0

5 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☒ No ☐

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☐
- Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐

6 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☒

If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:

- Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site retention BMPs ☒

4.4 Alternative Compliance Plan (if applicable)

Describe an alternative compliance plan (if applicable) for projects not fully able to infiltrate, or biotreat the DCV via on-site LID practices. A project proponent must develop an alternative compliance plan to address the remainder of the LID DCV. Depending on project type some projects may qualify for water quality credits that can be applied to reduce the DCV that must be treated prior to development of an alternative compliance plan (see Form 2.4-1, Water Quality Credits). Form 4.3-9 Item 8 includes instructions on how to apply water quality credits when computing the DCV that must be met through alternative compliance.

Alternative Designs – Facilities, or a combination of facilities, of a different design than in Permit Section E.12.e(ii)(f) may be permitted if all of the following measures of equivalent effectiveness are demonstrated:

1) Equal or greater amount of runoff infiltrated or evapotranspired;

2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;

3) Equal or greater protection against shock loadings and spills;

4) Equal or greater accessibility and ease of inspection and maintenance.

The Project Proponent will need to obtain written approval for an alternative design from the Lahontan Regional Water Board Executive Officer (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

All BMP included as part of the project WQMP are required to be maintained through regular scheduled inspection and maintenance (refer to Section 8, Post Construction BMP Requirements, in the TGD for WQMP). Fully complete Form 5-1 summarizing all BMP included in the WQMP. Attach additional forms as needed. The WQMP shall also include a detailed Operation and Maintenance Plan for all BMP and a Maintenance Agreement. The Maintenance Agreement must also be attached to the WQMP.

Note that at time of Project construction completion, the Maintenance Agreement must be completed, signed, notarized and submitted to the County Stormwater Department

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Education for Property Owners and Employees	Property Owner	Distribute educational materials and conduct annual awareness training	Upon first occupancy and yearly there after
Activity Restrictions	Property Owner	Activity restrictions such as posting "No Littering" signs to prevent pollution to stormwater BMP. Restrictions on activities which may have a negative impact on storm water quality, shall include prohibiting the storage of outdoor material, vehicle and equipment washing, outdoor processing, and fueling up. Pesticides will only be restricted to certified applicators. Inspections by the owner or representative as needed.	Inspect Daily, Maintenance as needed.
Street Vacuum Sweeping of Private Street & Parking Lots	Property Owner	Inspect parking lots for trash and accumulation of dust and debris. Street vacuum sweeping shall be conducted monthly	Inspections -Monthly. Maintenance - Monthly.
Drainage Facility Inspection and Maintenance	Property Owner	Inspect twice annually in the early fall before the rainy season and in the late Spring after the rainy season. Remove debris/sediment build-up.	Inspect twice annually, once before and after the rainy season and after extreme storm events. Maintenance as needed.
Landscape Planning & maintenance	Property Owner	Mow, weed, & trim vegetation. Inspect inlet & outlet structures. Re-vegetate bare areas. See below for further details.	Inspect weekly. Maintenance as needed.

Efficient Irrigation	Property Owner	Repair and maintain leaky/broken sprinkler heads. Install irrigation systems with timing devices to avoid overwatering. Repair as needed.	Inspect weekly and maintain as needed
Litter Control	Property Owner	Inspect and clean site for trash and debris. Direct maintenance personnel as necessary to ensure compliance	Check Daily and remove as needed.

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural Source Control BMP locations
- Site Design Hydrologic Source Control BMP locations
- LID BMP details
- Drainage delineations and flow information
- Drainage connections

6.2 Electronic Data Submittal

Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their local Implementation Plan), this section will describe the contents (e.g., layering, nomenclature, geo-referencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

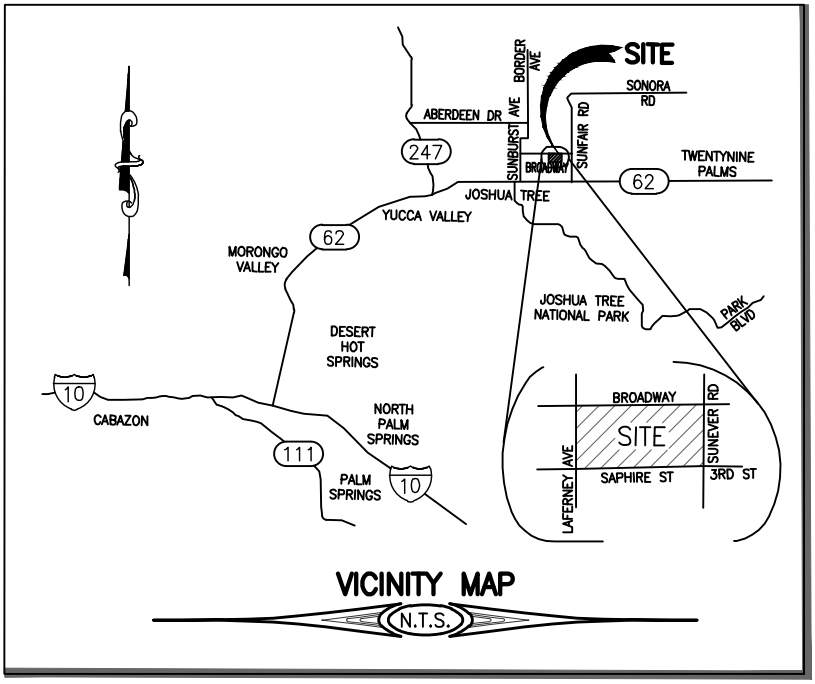
6.3 Post Construction

Attach all O&M Plans and Maintenance Agreements for BMP to the WQMP.

6.4 Other Supporting Documentation

- BMP Educational Materials
- Activity Restriction – C, C&R's & Lease Agreements

Appendix A:

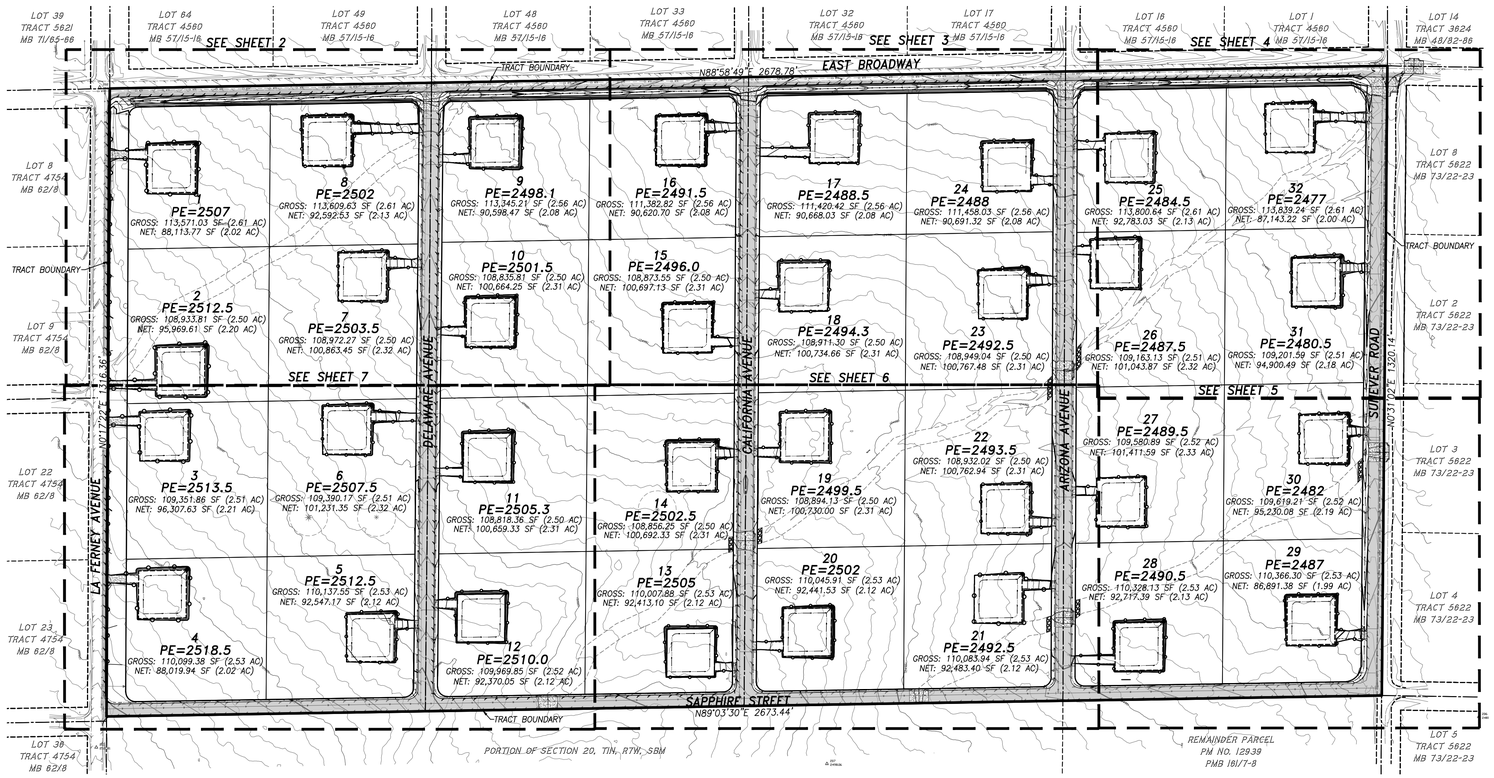


VICINITY MAP

N.T.S.

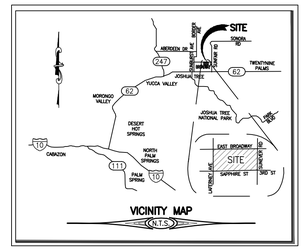
IN THE COUNTY OF SAN BERNARDINO, SATE OF CALIFORNIA

TRACT MAP NO. 20668
ROUGH GRADING PLAN



0 150 450
75 300 600

SCALE: 1" = 150'



GRADING NOTES:

1) ALL GRADING SHALL CONFORM TO THE LATEST CALIFORNIA BUILDING CODE (CBC) CHAPTERS 17, 18, APPENDIX J AND ALL APPLICABLE SECTIONS.
2) A GRADING PERMIT SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF ANY WORK ON THE SITE.
3) ISSUANCE OF A GRADING PERMIT DOES NOT ELIMINATE THE NEED FOR PERMITS FROM OTHER REGULATORY AGENCIES WITH REGULATORY RESPONSIBILITIES FOR CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE WORK AUTHORIZED IN THIS PLAN.
4) ALL WORK UNDER THIS PERMIT SHALL BE LIMITED TO WORK WITHIN THE PROPERTY LINES. A SEPARATE CONSTRUCTION, EXCAVATION OR ENCROACHMENT PERMIT FROM THE DEPARTMENT OF PUBLIC WORKS MAY BE REQUIRED FOR ANY WORK WITHIN THE COUNTY RIGHT-OF-WAY.
5) APPROVAL OF THESE PLANS DOES NOT AUTHORIZE ANY WORK OR GRADING TO BE PERFORMED UNTIL A VALID GRADING PERMIT HAS BEEN ISSUED.
6) THIS PLAN IS FOR GRADING PURPOSES ONLY AND IS NOT TO BE USED FOR THE PURPOSE OF CONSTRUCTING ONSITE OR OFFSITE IMPROVEMENTS. ISSUANCE OF A PERMIT BASED ON THIS PLAN DOES NOT CONSTITUTE APPROVAL OF DRIVEWAY LOCATIONS OR SIZES, PARKING LOT STRUCTURAL SECTIONS OR LAYOUT, ADA-RELATED REQUIREMENTS, BUILDING LOCATIONS OR FOUNDATIONS, WALLS, CURBING, OFFSITE DRAINAGE FACILITIES OR OTHER ITEMS NOT RELATED DIRECTLY TO THE BASIC GRADING OPERATION. ONSITE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE TO THE APPROVED BUILDING PERMIT PLANS. OFFSITE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE TO PLANS APPROVED FOR THIS PURPOSE BY THE PUBLIC WORKS DEPARTMENT.
7) MAXIMUM CUT AND FILL SLOPE = 2:1 (HORIZONTAL TO VERTICAL) AND MAXIMUM VERTICAL HEIGHT = 30 FEET, UNLESS AN APPROVED GEOTECHNICAL REPORT CAN JUSTIFY A STEEPER AND TALLER SLOPE.
8) NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL AND OTHER DELETERIOUS MATERIAL.
9) FILL SLOPES SHALL NOT HAVE LESS THAN 90% RELATIVE COMPACTION, OR AS RECOMMENDED ON THE APPROVED GEOTECHNICAL REPORT.
10) IT IS THE GRADING CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ADEQUATE COMPACTION HAS BEEN ATTAINED ON THE ENTIRE GRADING SITE, INCLUDING FILL AREAS OUTSIDE THE BUILDING PADS AND ON ALL FILL SLOPES.
11) UNLESS OTHERWISE RECOMMENDED IN AN APPROVED GEOTECHNICAL REPORT, OVER-EXCAVATION SHALL BE AT LEAST 24 INCHES MINIMUM BELOW THE BOTTOM OF FOOTINGS OR TO COMPETENT NATIVE SOIL OR BEDROCK MATERIALS, WHICHEVER IS DEEPER, AS APPROVED BY THE PROJECT'S GEOTECHNICAL ENGINEER OR GEOLOGIST.
12) EARTHWORK VOLUMES:
CUT_____(CY), FILL___ _ (CY), TOTAL DISTURBED AREA _ (SF)
13) EARTHWORK QUANTITIES ARE SHOWN FOR GRADING PERMIT PURPOSES ONLY, AND SAN BERNARDINO COUNTY IS NOT RESPONSIBLE FOR THEIR ACCURACY.
14) A COPY OF THE GRADING PERMIT AND APPROVED GRADING PLANS MUST BE IN THE POSSESSION OF A RESPONSIBLE PERSON AND AVAILABLE AT THE SITE AT ALL TIMES.
15) ANY ONSITE RETAINING WALLS SHOWN ON THE GRADING PLANS THAT ARE OVER 4' IN HEIGHT, MEASURED FROM TOP OF WALL TO BOTTOM OF FOOTING, ARE FOR REFERENCE ONLY. RETAINING WALLS OVER 4' IN HEIGHT ARE NOT CHECKED, PERMITTED, OR INSPECTED PER THE GRADING PERMIT. A SEPARATE RETAINING WALL PERMIT IS REQUIRED FOR ALL RETAINING WALLS OVER 4' IN HEIGHT.
16) ANY WALLS, FENCES, STRUCTURES AND/OR APPURTENANCES ADJACENT TO THIS PROJECT ARE TO BE PROTECTED IN PLACE. IF GRADING OPERATIONS DAMAGE OR ADVERSELY AFFECT SAID ITEMS IN ANY WAY, THE CONTRACTOR AND/OR DEVELOPER IS RESPONSIBLE FOR WORKING OUT AN ACCEPTABLE SOLUTION TO THE SATISFACTION OF THE AFFECTED PROPERTY OWNER(S).
17) FOR SITES WITH PROTECTED SPECIES OR TREES, THE PROPOSED GRADING MAY BE SUBJECT TO A SEPARATE PERMIT.
18) ADEQUATE FIRE ACCESS AROUND BUILDINGS (INCLUDING GARAGES) SHOULD BE PROVIDED AS APPROVED BY COUNTY FIRE.
19) EXISTING DRAINAGE COURSES SHALL NOT BE OBSTRUCTED, ALTERED, OR DIVERTED WITHOUT PRIOR APPROVAL FROM THE COUNTY OF SAN BERNARDINO, LAND DEVELOPMENT DIVISION. A STREAMBED ALTERATION AGREEMENT MAY ALSO BE REQUIRED FROM THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
20) DRAINAGE EASEMENTS SHALL NOT BE OBSTRUCTED, ALTERED OR DIVERTED WITHOUT PRIOR APPROVAL OF THE COUNTY OF SAN BERNARDINO, LAND DEVELOPMENT DIVISION.
21) SETBACKS AND BUILDING LOCATIONS SHOWN ON THIS PLAN ARE FOR REFERENCE ONLY AND MUST BE REVIEWED AND APPROVED UNDER A SEPARATE BUILDING PERMIT.
22) UTILITY AND SEPTIC IMPROVEMENTS SHOWN ON THIS PLAN ARE FOR REFERENCE ONLY AND MUST BE REVIEWED AND APPROVED UNDER A SEPARATE BUILDING PERMIT.
23) ON PROJECTS DISTURBING ONE ACRES OR MORE, THE FOLLOWING NOTE MUST BE ADDED: A NOTICE OF INTENT (NOI) HAS BEEN, OR WILL BE FILED WITH THE STATE WATER RESOURCES CONTROL BOARD (SWRCB) AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) HAS BEEN OR WILL BE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF CALIFORNIA GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (PERMIT NO. CAS000002) FOR ALL OPERATIONS ASSOCIATED WITH THESE PLANS. THE PERMITTEE SHALL KEEP A COPY OF THE SWPPP ON SITE AND AVAILABLE FOR REVIEW BY THE COUNTY.
24) IN CONJUNCTION WITH THE CALIFORNIA GENERAL PERMIT FOR PROPOSED DISTURBANCE OVER ONE ACRE, AN ACTIVE WASTEWATER DISCHARGE ID # (WDID) _____MUST BE INCLUDED ON THE FINAL GRADING PLAN.
25) A FINAL GRADING CERTIFICATION WILL BE COLLECTED BY THE BUILDING INSPECTOR AT THE FINAL BUILDING INSPECTION OR PRIOR TO A GRADING FINAL STATUS ON THE PERMIT. THE FINAL GRADING CERTIFICATION IS TO BE COMPLETED BY THE ENGINEER OF RECORD.
26) THE SOILS ENGINEER SHALL PROVIDE A FINAL SOIL GRADING REPORT INCLUDING LOCATIONS AND ELEVATIONS OF FIELD DENSITY TESTS, SUMMARIES OF FIELD AND LABORATORY TESTS AND OTHER SUBSTANTIATING DATA AND COMMENTS ON ANY CHANGES MADE DURING GRADING AND THEIR EFFECT ON THE RECOMMENDATIONS MADE IN THE SOIL ENGINEERING INVESTIGATION REPORT. IT SHALL ALSO PROVIDE INFORMATION AS TO LOCATION AND NATURE OF TESTS, STATEMENTS RELATIVE TO THE EXPANSIVE NATURE OF SOIL AND/OR ROCK MATERIAL, LIMITS OF COMPACTED FILL SHOWN ON THE AS-GRADED PLAN AND CERTIFICATION AS TO THE ADEQUACY AND STABILITY OF THE SITE FOR THE INTENDED USE.
27) IF APPLICABLE, THE ENGINEERING GEOLOGIST SHALL PROVIDE A GEOLOGIC GRADING REPORT INCLUDING A FINAL DESCRIPTION OF THE GEOLOGY OF THE SITE INCLUDING ANY NEW INFORMATION DISCLOSED DURING THE GRADING AND THE EFFECT OF SAME ON RECOMMENDATIONS INCORPORATED IN THE APPROVED GRADING PLAN. THE ENGINEERING GEOLOGIST SHALL PROVIDE CERTIFICATION AS TO THE ADEQUACY OF THE SITE FOR THE INTENDED USE AS AFFECTED BY GEOLOGIC FACTORS. WHERE NECESSARY, A REVISED GEOLOGIC MAP AND CROSSSECTIONS, AND ANY RECOMMENDATIONS REGARDING SPECIAL BUILDING RESTRICTIONS OR FOUNDATION SETBACKS SHALL BE INCLUDED.
28) SHOULD THE EXCAVATION DISCLOSE SOIL AND/OR ROCK CONDITIONS WHERE CUT SLOPES ARE UNSTABLE, THE ENGINEERING GEOLOGIST AND/OR THE SOILS ENGINEER SHALL RECOMMEND NECESSARY TREATMENT TO THE BUILDING OFFICIAL FOR APPROVAL.
29) GEOLOGICAL AND SOILS ENGINEERING REPORTS BY _____, DATED _____ AND ALL SOILS REPORT ADDENDUM(DA) SHALL BE INCORPORATED HEREWITH AND MADE PART OF THIS GRADING PLAN.
30) THE CONTRACTOR SHALL IMPLEMENT PREVENTIVE MEASURES TO ASSURE THAT NO ROCKS, SOIL, DUST, OR DEBRIS OF ANY FORM SHALL FALL, SLIDE OR FLOW ONTO ADJOINING PROPERTIES OR PUBLIC WAYS. ALL VEHICLE LOADS SHALL BE TRIMMED AND WATERED OR OTHERWISE SECURED TO PREVENT SPILLAGE FROM THE EQUIPMENT.
31) ALL EXPORT AND IMPORT OF MATERIAL OVER DEDICATED AND IMPROVED STREETS SHALL BE UNDERTAKEN OR CONDUCTED BY EQUIPMENT THAT COMPLIES IN ALL RESPECTS TO THE STATE VEHICLE CODE. REPAIR TO ANY DAMAGED DEDICATED OR IMPROVED STREETS SHALL BE MADE TO THE SATISFACTION OF THE BUILDING OFFICIAL AND IS THE RESPONSIBILITY OF THE OWNER, PERMITTEE, AND THE GRADING CONTRACTOR.
32) ALL FLOOD ZONE REQUIREMENTS MUST BE REFLECTED OR ACCOUNTED FOR ON THE GRADING PLANS. ELEVATIONS OR CONSTRUCTION NOTES MUST BE INCLUDED IN THE PLANS TO ENSURE COMPLIANCE WITH ALL APPLICABLE FIRST FLOOR ELEVATION REQUIREMENTS PER FEMA AND SAN BERNARDINO COUNTY DEVELOPMENT CODE GUIDELINES.
33) ALL GRADING SHALL COMPLY WITH SBC DEVELOPMENT CODE SECTION 82.14.050.C:
IF FILL IS PLACED TO ELEVATE PADS ABOVE BASE ELEVATION, IT MUST BE DEMONSTRATED THAT FILL WILL NOT SETTLE AND IS PROTECTED FROM EROSION, SCOUR, OR DIFFERENTIAL SETTLEMENT, AS FOLLOWS.
a) THE PAD ELEVATION SHALL BE CERTIFIED TO MEET OR EXCEED THE ELEVATION REQUIRED BY THE APPLICABLE FLOODPLAIN SAFETY REVIEW AREA, AND IT MUST BE DEMONSTRATED THAT THE CUMULATIVE EFFECT OF THE PROPOSED DEVELOPMENT WHEN COMBINED WITH ALL OTHER EXISTING AND ANTICIPATED DEVELOPMENT WILL NOT INCREASE THE WATER SURFACE ELEVATION OF THE BASE FLOOD AT ANY POINT WITHIN THE COMMUNITY.
b) FILL SHALL BE COMPACTED TO 95 PERCENT PER ASTM (AMERICAN SOCIETY OF TESTING MATERIALS) STANDARD D-698.
c) FILL SLOPES SHALL BE NO STEEPER THAN TWO FEET HORIZONTAL TO ONE FOOT VERTICAL RATIO UNLESS SUBSTANTIATING DATA FOR STEEPER SLOPES IS PROVIDED, AND THE SLOPES ARE APPROVED BY THE COUNTY.
d) FILL SLOPES ADJACENT TO A WATER COURSE MAY BE REQUIRED TO BE ARMORED WITH STONE, ROCK OR APPROVED EQUAL PROTECTION.
34) FOR NONRESIDENTIAL PROJECTS, PROVIDE FOLLOWING NOTE ON PLANS: CALIFORNIA GREEN BUILDING STANDARDS CODE
5.408.3 EXCAVATED SOIL AND LAND CLEARING DEBRIS.
100 PERCENT OF TREES, STUMPS, ROCKS AND ASSOCIATED VEGETATION AND SOILS RESULTING PRIMARILY FROM LAND CLEARING SHALL BE REUSED OR RECYCLED. FOR A PHASED PROJECT, SUCH MATERIAL MAY BE STOCKPILED ON SITE UNTIL THE STORAGE SITE IS DEVELOPED.
EXCEPTION: REUSE, EITHER ON-OR OFF-SITE, OF VEGETATION OR SOIL CONTAMINATED BY DISEASE OR PEST INFESTATION.

SOILS ENGINEER'S CERTIFICATION:

THIS GRADING PLAN HAS BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN CONFORMANCE WITH THE RECOMMENDATIONS AS OUTLINED IN THE FOLLOWING SOILS AND GEOLOGICAL REPORT FOR THIS PROJECT.

REPORT TITLE:
REPORT DATE:
FIRM NAME:

DATE SEAL

CONSTRUCTION NOTES & QUANTITIES

THE QUANTITIES SHOWN BELOW ARE FOR BONDING INFORMATION ONLY. THE CONTRACTOR IS TO CONSTRUCT PROJECT PER THESE PLANS AND SUBMIT CONSTRUCTION BID BASED ON THEIR OWN QUANTITY "TAKE-OFF".

(1) INSTALL ¼ TON RIP-RAP, #2 BACKING.....1,521 SF
(2) INSTALL 3'X10' ¼ TON RIP-RAP PAD.....2,623 SF

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBER: 0605-051-01

DRAINAGE NOTE:

CROSS-LOT DRAINAGE EXISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL AGREE TO ACCEPT RUNOFF FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED RUNOFF IS NOT ALTERED. EACH LOT OWNER SHALL AGREE NOT TO ALTER THE QUANTITY OR QUALITY OF THE RUNOFF FROM THEIR LOT ONTO THE ADJACENT PROPERTY. NO LOT GRADING WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAD GRADING, SWALES AND RUNOFF MITIGATION.

LEGEND

CL	CENTERLINE	P.I.P.	PROTECT IN PLACE
EP	EDGE OF PAVEMENT	R/W	RIGHT OF WAY
EX.	EXISTING	TYP.	TYPICAL
FL	FLOW LINE	WTR	WATER
FS	FINISHED SURFACE		
FG	FINISHED GROUND		
HP	HIGH POINT		
LP	LOW POINT		
N.T.S.	NOT TO SCALE		
PE	PAD ELEVATION		
PROP.	PROPOSED		
PL	PROPERTY LINE		

CENTERLINE
PROP. RIGHT OF WAY
EX. RIGHT OF WAY
PROPERTY LINE
EX. PROPERTY LINE
PROJECT BOUNDARY
MAJOR EX. CONTOUR
MINOR EX. CONTOUR
PROP. MAJOR CONTOUR
PROP. MINOR CONTOUR
FLOW LINE
EDGE OF PAVEMENT
EX. FENCE
PROP. DAYLIGHT
PROP. ASPHALT
PROP. CONCRETE

EARTHWORK

	CUT (C.Y.)	FILL (C.Y.)
RAW EARTHWORK:	13,077	27,320
NET IMPORT/EXPORT = O (C.Y.)	---	14,243

ENGINEER

ADKAN ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA 92504
TELEPHONE: (951) 688-0241
EMAIL: RREAVES@ADKAN.COM

ASSESSORS PARCEL NUMBERS

0605-051-01

OWNER/DEVELOPER

KIM CHEN
J.T. SANTORI VILLA LLC
1751 COLORADO BLVD., #333
LOS ANGELES, CA 90041
PHONE: (626) 673-2672
EMAIL: kim@homeparadiserg.com

SOILS ENGINEER

SLADDEN ENGINEERING
45090 GOLF CENTER PARKWAY, STE F
INDIO, CA 92201
TELEPHONE: (760) 863-0713

UTILITIES

ELECTRIC:
SOUTHERN CALIFORNIA EDISON
P.O. BOX 11482
SANTA ANA, CA 92711
(714) 796-9920

TRASH SERVICES:
4878 NEWTON ROAD
YUCCA VALLEY, CA 92284
(760) 340-2113

WATER:
JOSHUA BASIN WATER DIST.
61750 CHOLITA RD.
JOSHUA TREE, CA 92252
(760) 336-8438

TELEPHONE:
AT&T
(800) 310-2355

GAS:
SOUTHERN CALIFORNIA GAS COMPANY
(800)742-2200
DEVELOPER WILL USE PROPANE

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9191

BASIS OF BEARINGS

THE CENTERLINE OF SUNEVER AVENUE BEING NORTH 00°31'35" EAST PER PARCEL MAP NO. 12939, FILED IN BOOK 161 OF PARCEL MAPS, AT PAGES 7 AND 8, RECORDS OF SAN BERNARDINO COUNTY, WAS HELD AS THE BASIS OF BEARINGS FOR THIS MAP.

SHEET INDEX

SHEET 1:	TITLE SHEET
SHEET 2-7:	GRADING
SHEET 8:	SECTIONS
SHEET 9:	EROSION CONTROL

Underground Service Alert
DIAL BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK
BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER RICHARD DAIL REAVES NO. 80614 EXP. 03/31/27 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH DATE
LAND DEVELOPMENT MANAGER

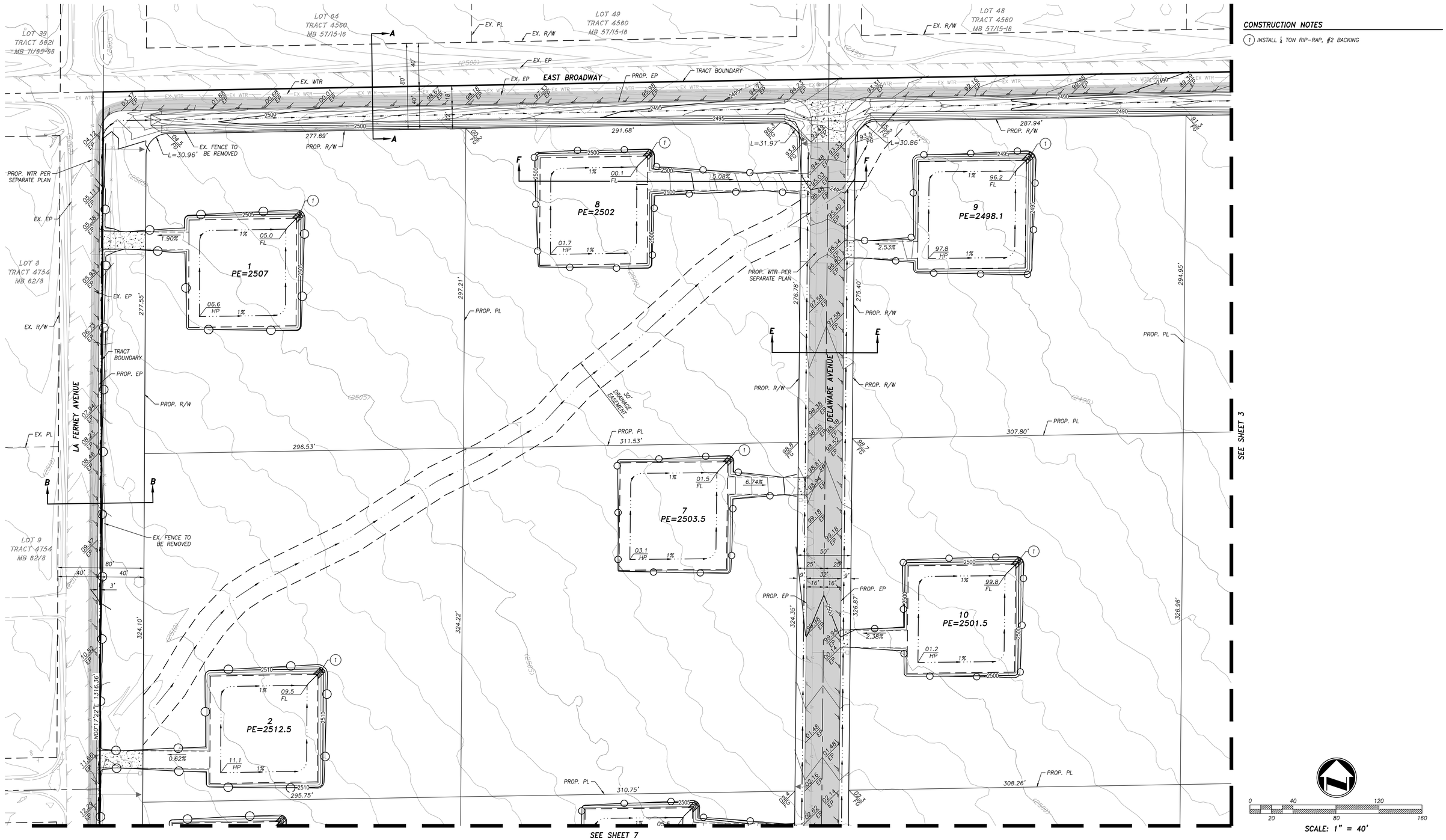
TITLE SHEET

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 1 OF 9



CONSTRUCTION NOTES

(1) INSTALL ½ TON RIP-RAP, #2 BACKING

0 20 40 80 120 160

SCALE: 1" = 40'

Underground Service Alert

CALL BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering - Surveying - Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

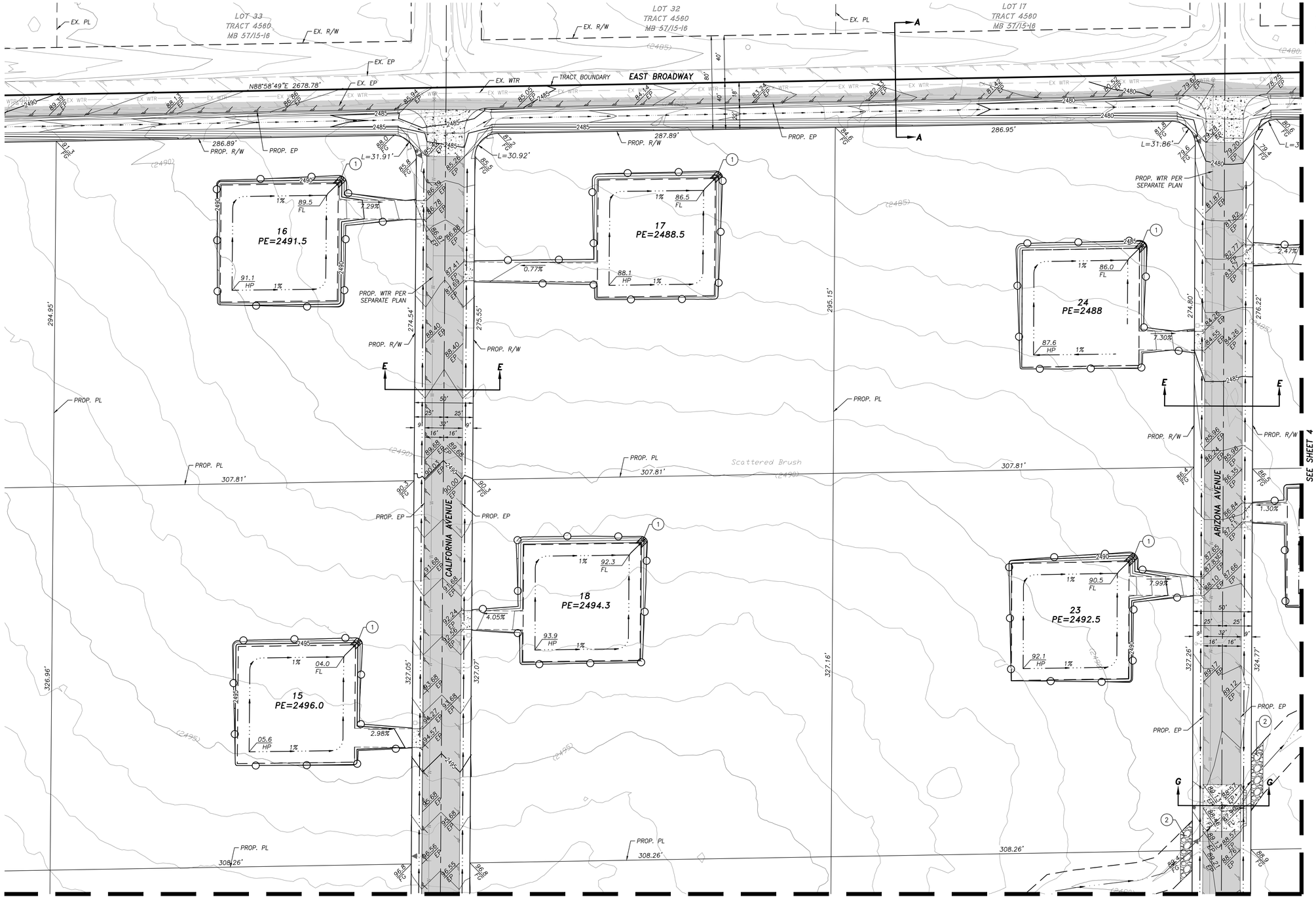
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 2 OF 9



CONSTRUCTION NOTES

1. INSTALL ¼ TON RIP-RAP, #2 BACKING
2. INSTALL 3'X10' ¼ TON RIP-RAP PAD

Underground Service Alert

DIG BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

RECOMMENDED BY:

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

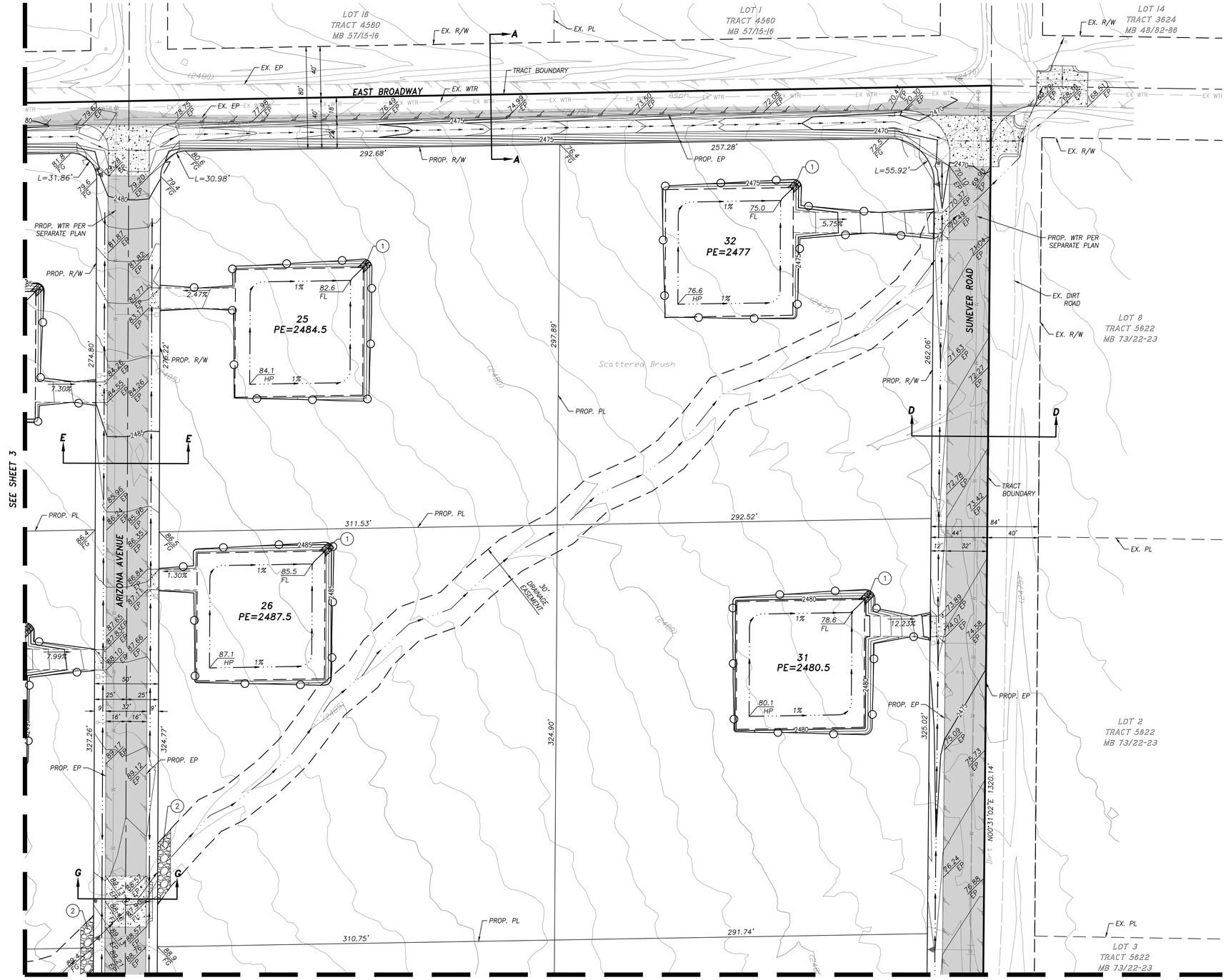
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 3 OF 9



CONSTRUCTION NOTES

1. INSTALL ¼ TON RIP-RAP, #2 BACKING
2. INSTALL 3'X10' ¼ TON RIP-RAP PAD

Underground Service Alert

CALL BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

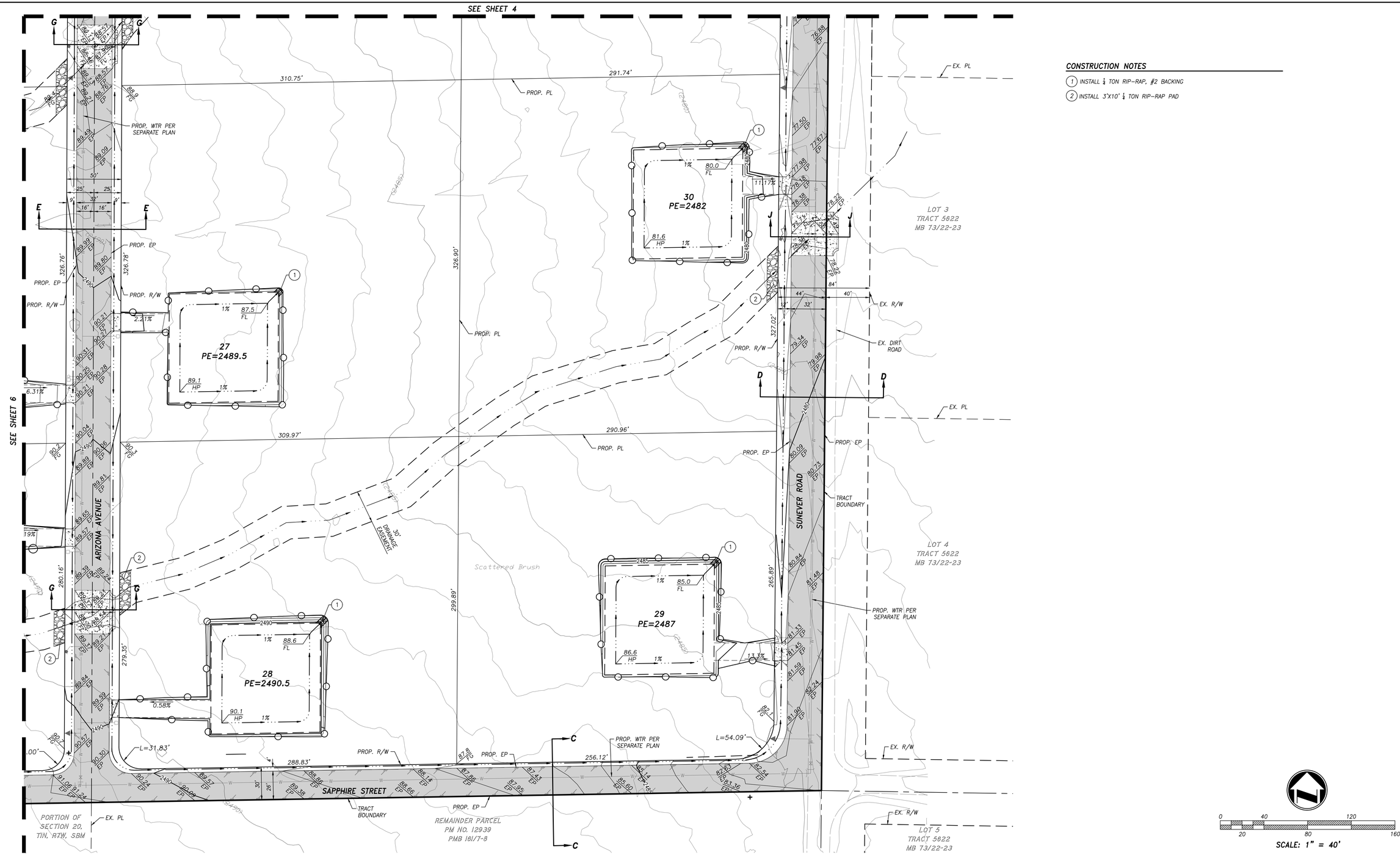
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 4 OF 9



Underground Service Alert

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REYES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REYES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

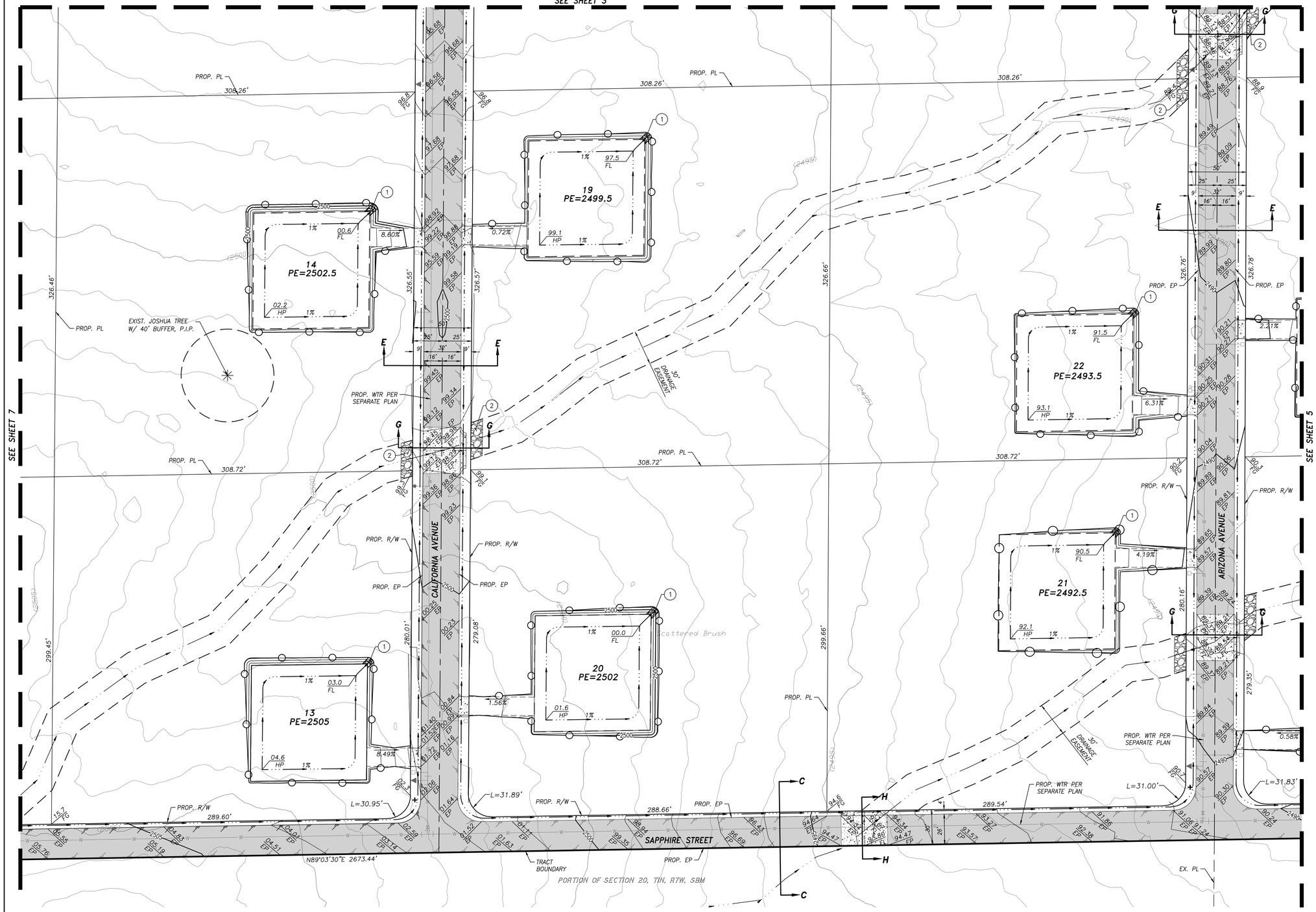
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 5 OF 9



Underground Service Alert

CALL BEFORE YOU DIG

Call: TOLL FREE

1-800-227-2600

TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

ROUGH GRADING

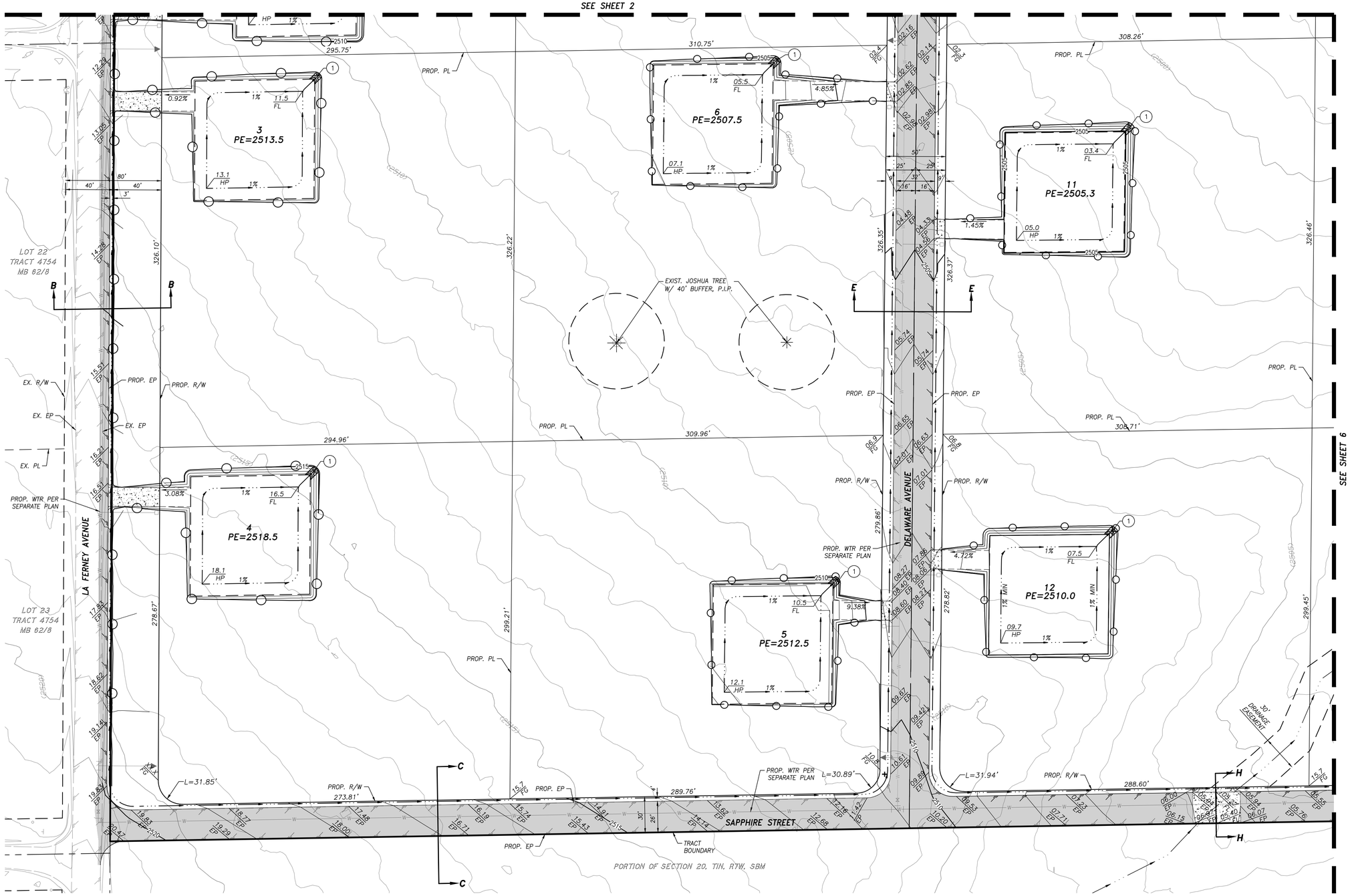
TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

SHEET 6 OF 9

SEE SHEET 2



SEE SHEET 6

CONSTRUCTION NOTES

(1) INSTALL ¼ TON RIP-RAP, #2 BACKING

0 40 120
20 80 160
SCALE: 1" = 40'

Underground Service Alert
DIG ALERT BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK
BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:
GREG GRIFFITH DATE
LAND DEVELOPMENT MANAGER

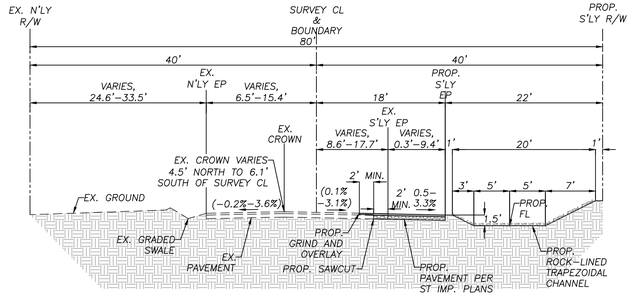
ROUGH GRADING

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

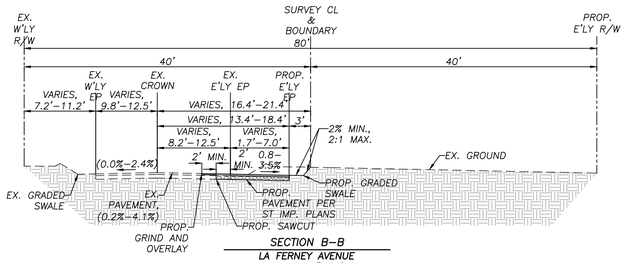
ROAD NO.

FILE NO.

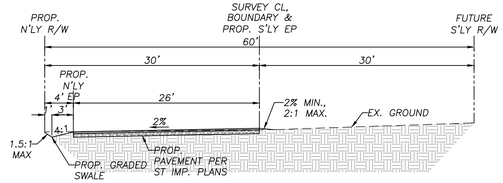
SHEET 7 OF 9



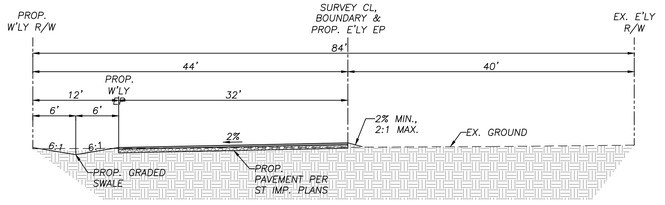
SECTION A–A
EAST BROADWAY
SCALE: 1"=10'



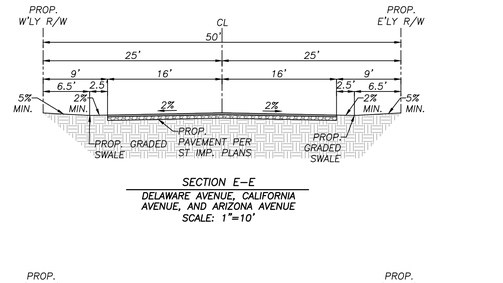
SECTION B–B
LA FERNEY AVENUE
SCALE: 1"=10'



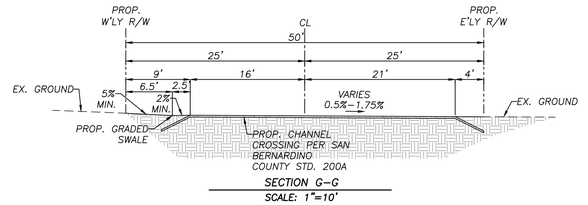
SECTION C–C
SAPPHIRE STREET
SCALE: 1"=10'



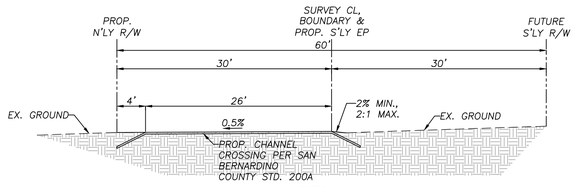
SECTION D–D
SUNEVER ROAD
SCALE: 1"=10'



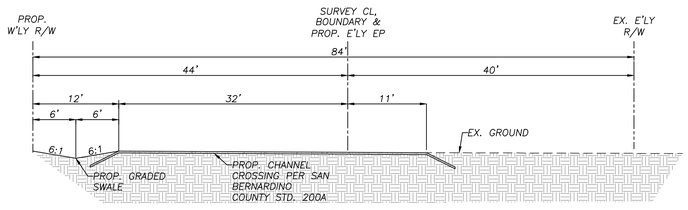
SECTION E–E
DELAWARE AVENUE, CALIFORNIA AVENUE, AND ARIZONA AVENUE
SCALE: 1"=10'



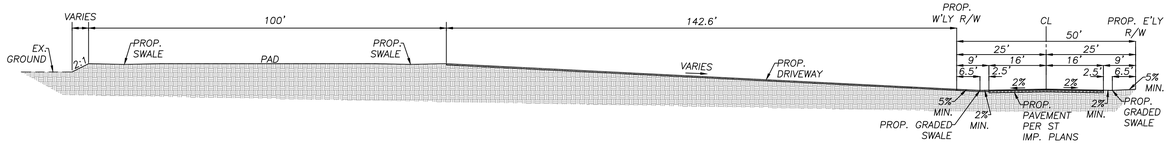
SECTION G–G
SCALE: 1"=10'



SECTION H–H
SCALE: 1"=10'



SECTION J–J
SCALE: 1"=10'



SECTION F–F
SCALE: 1"=20'

Underground Service Alert
DIG BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK

BM 62–1–11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:

adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

SECTIONS

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

ROAD NO.

FILE NO.

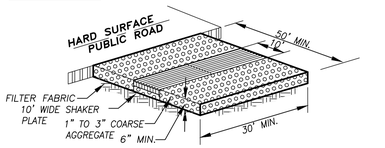
SHEET 8 OF 9

EROSION CONTROL NOTES (LAND DEVELOPMENT DIVISION)

1. IN CASE OF EMERGENCY, CALL (RESPONSIBLE PERSON) AT (24-HOUR TELEPHONE).
2. POLLUTION AND EROSION PREVENTION MEASURES, ALSO KNOWN AS BEST MANAGEMENT PRACTICES (BMPS), MUST BE INSTALLED PRIOR TO GRADING. THESE MEASURES, INCLUDING THE PREVENTION OF SEDIMENTATION OR FLOOD DAMAGE, TO OFFSITE PROPERTY SHALL BE ADEQUATE WHETHER OR NOT AN EROSION CONTROL PERMIT IS REQUIRED.
3. ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ONSITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, OR WIND.
4. EROSION CONTROL DEVICES SHALL BE FUNCTIONING AT ALL TIMES. IN CASE OF FAILURE, RAPID CONSTRUCTION OF EMERGENCY DEVICES SHALL BE IMPLEMENTED.
5. STOCKPILES OF EARTH AND OTHER CONSTRUCTION-RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER.
6. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOILS AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.
7. EXCESS OR WASTE CONCRETE MUST BE CONTAINED ONSITE. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ONSITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
8. DEVELOPERS/CONTRACTORS ARE RESPONSIBLE TO ENSURE ALL EROSION CONTROL DEVICES AND BMPS ARE INSTALLED AND FUNCTIONING PROPERLY PER PLAN. PROPER PRECAUTION SHALL BE CONSIDERED WHEN 50% OR GREATER PROBABILITY OF PREDICTED PRECIPITATION, AND AFTER ACTUAL PRECIPITATION. A CONSTRUCTION SITE INSPECTION CHECKLIST AND INSPECTION LOG SHALL BE MAINTAINED AT THE PROJECT SITE AT ALL TIMES AND AVAILABLE FOR REVIEW BY THE BUILDING OFFICIAL.
9. TRASH AND CONSTRUCTION-RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.
10. SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.
11. ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED SO AS TO INHIBIT EROSION BY WIND AND WATER.
12. ALL SILT AND DEBRIS SHALL BE REMOVED FROM ALL DEVICES WITHIN 24 HOURS AFTER EACH RAINSTORM AND BE DISPOSED OF PROPERLY.
13. ALL STORM WATER CAPTURE DEVICES SHALL BE PROTECTED AT ALL TIMES.
14. EROSION AND SEDIMENT CONTROL PRACTICES SHOULD BE IN CONFORMANCE WITH STANDARD PRACTICE. THE MOST COMMON EROSION CONTROL MEASURES ARE:
    a. SCHEDULING
    b. PRESERVATION OF EXISTING VEGETATION
    c. STOCKPILE MANAGEMENT
    d. SILT FENCE
    e. FIBER ROLLS
    f. SANDBAG BARRIER
    g. STRAW BALE BARRIER
    h. STORM DRAIN INLET PROTECTION
    i. CONCRETE WASTE MANAGEMENT
    j. VEHICLE AND EQUIPMENT FUELING
    k. VEHICLE AND EQUIPMENT MAINTENANCE
    l. STABILIZED CONSTRUCTION ENTRANCE/EXIT
    m. ENTRANCE/EXIT TIRE WASH
    n. WIND EROSION CONTROL
15. DUST SHALL BE CONTROLLED BY WATERING.

LEGEND

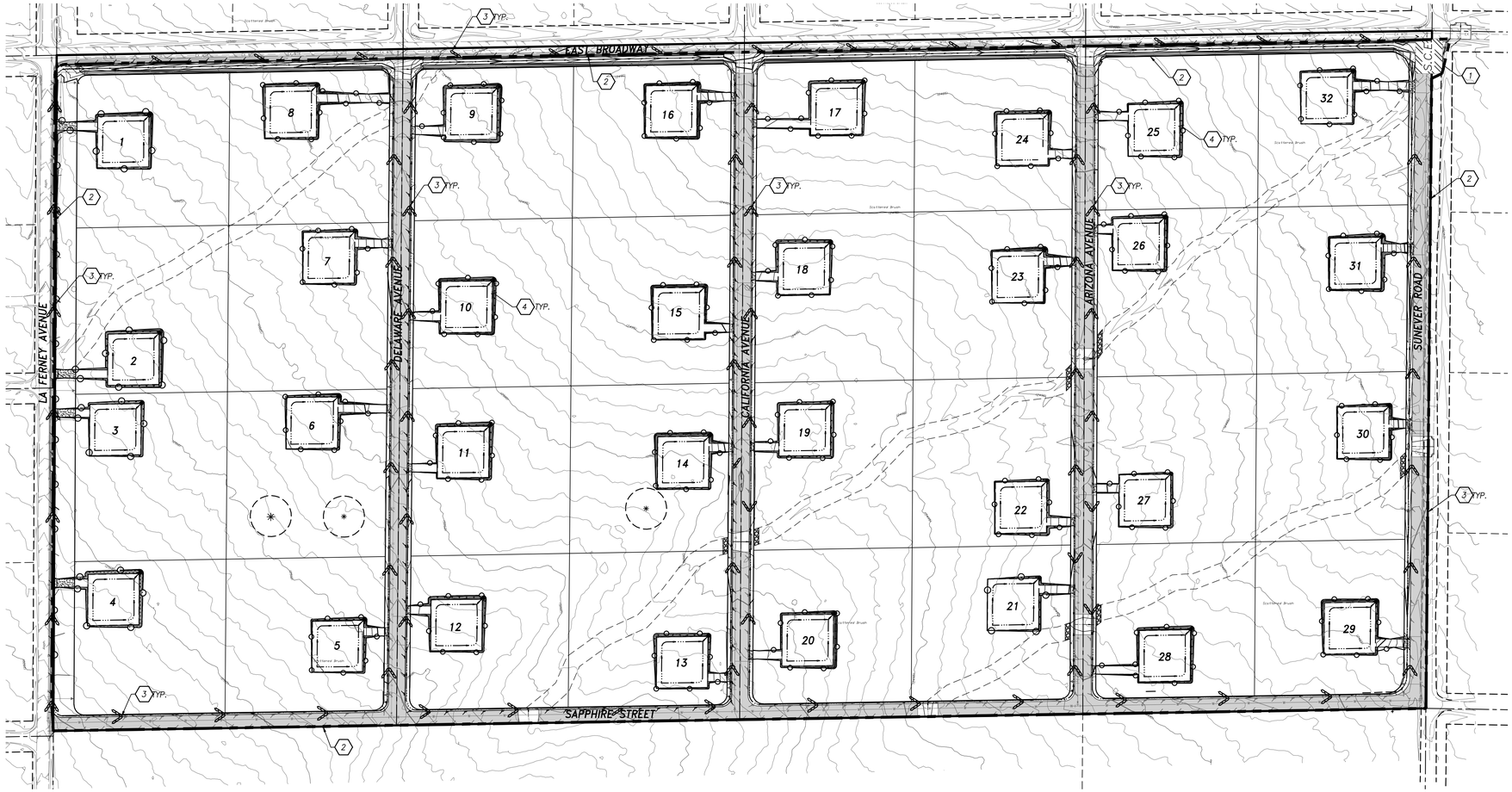
- S.C.E. = STABILIZE CONSTRUCTION ENTRANCE W\GRAVEL
- = SILT FENCE PER DETAIL HEREON
- = GRAVELBAG BARRIER PER DETAIL HEREON
- = HYDROSEED

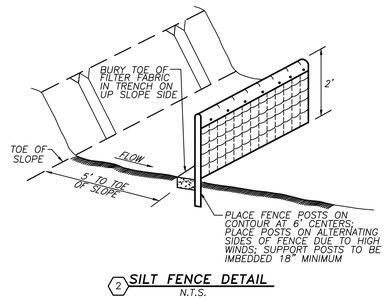


1 STABILIZED CONSTRUCTION ENTRANCE
N.T.S.

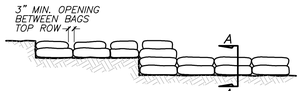
IN THE COUNTY OF SAN BERNARDINO, SATE OF CALIFORNIA

TRACT MAP NO. 20668
EROSION CONTROL PLAN

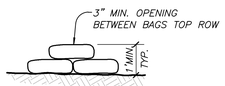




2 SILT FENCE DETAIL
N.T.S.

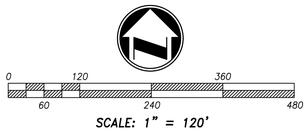


TYPICAL GRAVELBAG DETAIL
N.T.S.



3 GRAVELBAG CONTROL DETAILS
N.T.S.

INLET PROTECTION DETAIL
N.T.S.



SCALE: 1" = 120'

CONSTRUCTION NOTES & QUANTITIES

THE QUANTITIES SHOWN BELOW ARE FOR BONDING PURPOSES ONLY. THE CONTRACTOR IS TO CONSTRUCT PROJECT PER THESE PLANS AND SUBMIT BID BASED ON THEIR OWN QUANTITY "TAKE-OFF."

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE PER CASQA FACT SHEET TC-1 AND DETAIL HEREON.....1 EA
2. INSTALL SILT FENCE PER CASQA FACT SHEET SE-1 AND DETAIL HEREON .....8,000 LF
3. INSTALL GRAVEL BAGS PER CASQA FACT SHEET SE-6 AND DETAIL HEREON.....2,714 LF
4. INSTALL HYDROSEED.....61,140 SF

Underground Service Alert
DIAL BEFORE YOU DIG
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK
BM 62-1-11
9.85 MILE EAST ALONG STATE HIGHWAY 62 FROM THE POST OFFICE AT YUCCA VALLEY, AT THE INTERECTION OF HIGHWAY 62 AND RICE AVENUE, 187 FT. NORTH OF THE CENTER LINE OF THE HIGHWAY, 35 FT. WEST OF THE CENTERLINE OF RICE AVENUE, 10 FT. WEST OF A POWER POLE 70557 WITH LINES NORTH, SOUTH, EAST, AND WEST. NOTE BM MAY ALSO BE REACHED BY GOING 13.15 MILE WEST ALONG STATE HIGHWAY 62 FROM ITS INTERSECTION WITH ADOBE ROAD AT TWENTYNINE PALMS.
ELEVATION: 2601.15 NAVD 1988

PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying · Planning
6820 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599
Under the Supervision of: RICHARD DAIL REAVES, R.C.E. 80614 EXP. 03.31.27 Date

REGISTERED PROFESSIONAL ENGINEER
RICHARD DAIL REAVES
NO. 80614
EXP. 03/31/27
CIVIL
STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF PUBLIC WORKS

GHASSAN SHELLEH — DATE
SUPERVISING ENGINEER, TRAFFIC DIVISION

JEREMY JOHNSON — DATE
ENGINEERING MANAGER, TRAFFIC DIVISION

RECOMMENDED BY:

APPROVED BY:

GREG GRIFFITH — DATE
LAND DEVELOPMENT MANAGER

EROSION CONTROL

TRACT NO. 20668
APN 0605-051-01
JOSHUA TREE

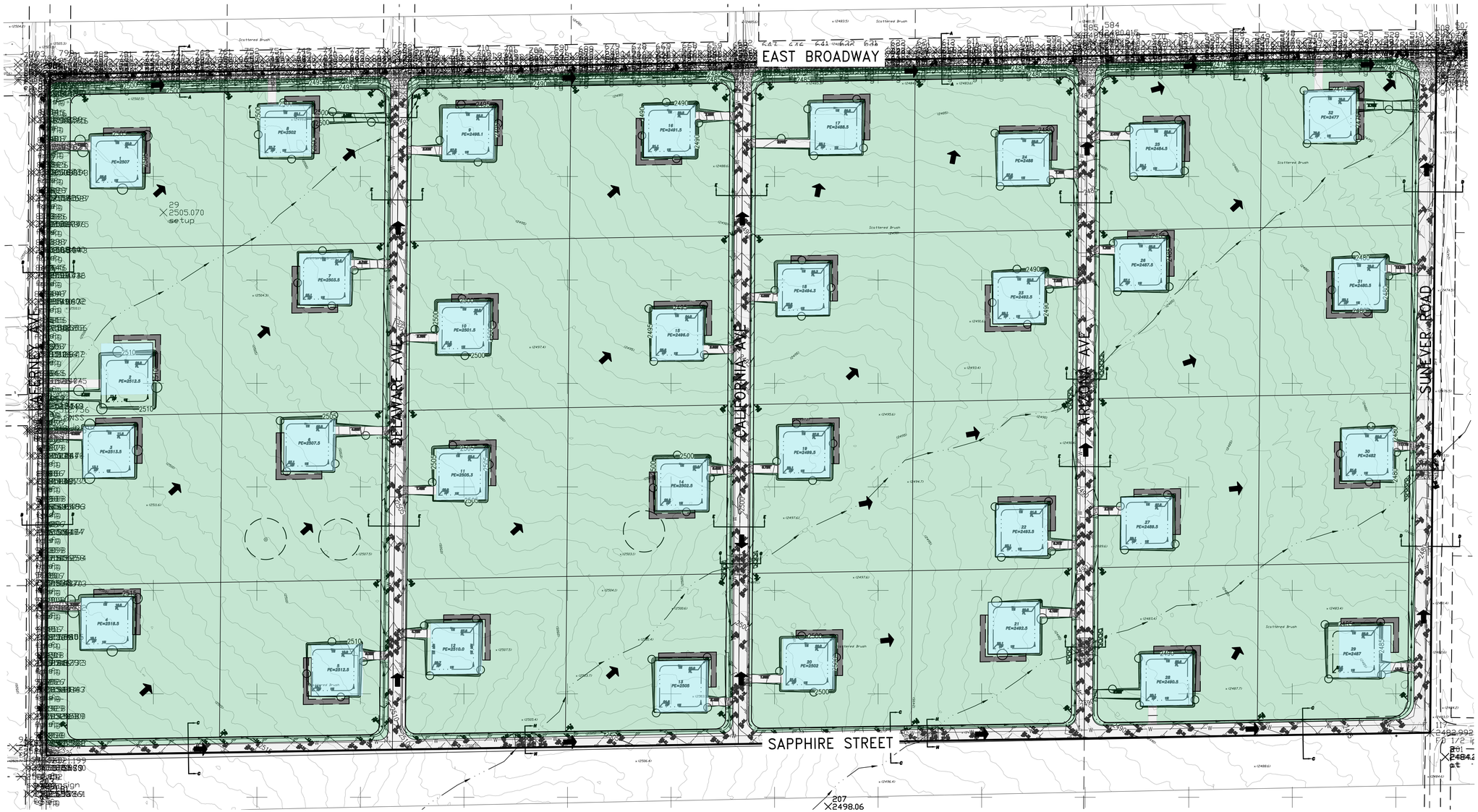
ROAD NO.

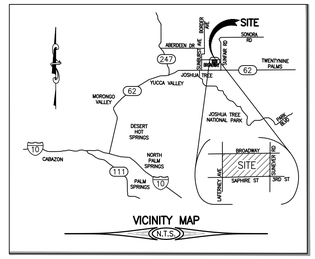
FILE NO.

SHEET 9 OF 9

Appendix B:

BMP MAP
JOSHUA TREE ESTATES
TTM 20668





LEGEND

- PROPOSED HOMES (65% IMPERVIOUS)
- STREETS/DRIVEWAYS (100% IMPERVIOUS)
- PRESERVED NATURAL VEGETATION (10% IMPERVIOUS)
- INFILTRATION TRENCH (100% PERVIOUS)
- DRAINAGE PATH
- DRAINAGE AREA BOUNDARY

BMP DATA DMA			
DMA	NAME	SURFACE TYPE	AREA (SF)
D 1.1	HOMES	ROOF	208,000
D 1.1	HOMES	LANDSCAPING	112,000
D 1.2	STREETS/DRIVEWAYS	ASPHALT/CONCRETE PAVEMENT	282,386
D 1.3	LOTS	PRESERVED NATURAL VEGETATION	2,862,505
D 1.4	INFILTRATION TRENCHES	GravEL-LINED TRENCH	54,097
TOTAL			3518988

SUMMARY

TOTAL AREA: 3,526,181 SF (80.95 AC)
IMPERVIOUS AREA: 490,386 SF (11.25 AC) (13.9%)
PERVIOUS AREA: 3,035,795 SF (69.70 AC) (86.1%)

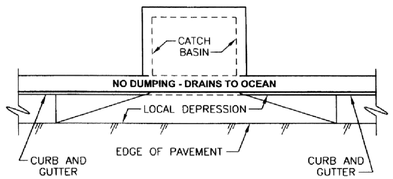
0 100 200
50 150 250
SCALE: 1" = 100'

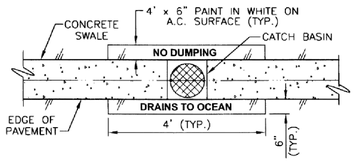
BMP MAP
JOSHUA TREE ESTATES
TTM 20668
PREPARATION DATE: FEBRUARY 2025
REVISION DATE:
JOB NUMBER: 10754
PLANS PREPARED BY:

adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

PLOT DATE: 8/21/2025 1:13 PM

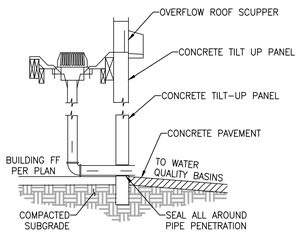
U:\PROJECTS\HOME PARADISE\10754 - JOSHUA TREE\ENGINEERING\WQMP\BMP MAP\10754 BMP MAP.DWG





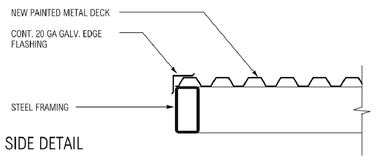
CATCH BASIN STENCILING DETAIL

NTS

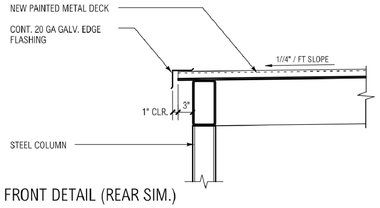


ROOF DRAIN DETAIL

SCALE: NTS



SIDE DETAIL



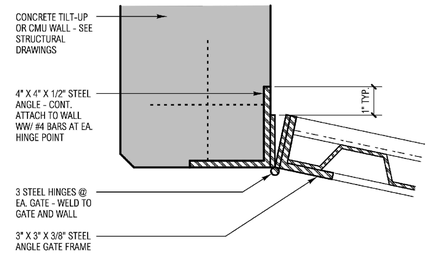
FRONT DETAIL (REAR SIM.)

NOTES:
1. SEE STRUCTURAL DRAWINGS FOR ADDITIONAL NOTES
2. PAINT ALL EXPOSED STEEL AND FLASHING

EDGE OF TRASH ENC. CANOPY DETAIL

N.T.S.

12



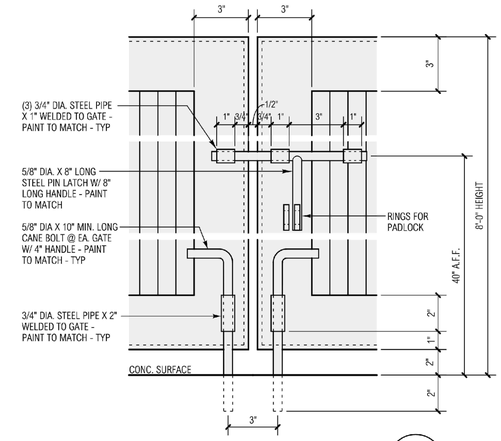
NOTES:
1. PROVIDE HINGES WITH GREASE ZERTS.
2. PAINT ALL METAL TO MATCH BUILDING.
3. SEE STRUCTURAL DWGS FOR FURTHER NOTES.

TRASH ENCLOSURE GATE & HINGE

SCALE: 3" = 1'-0"

01202

8

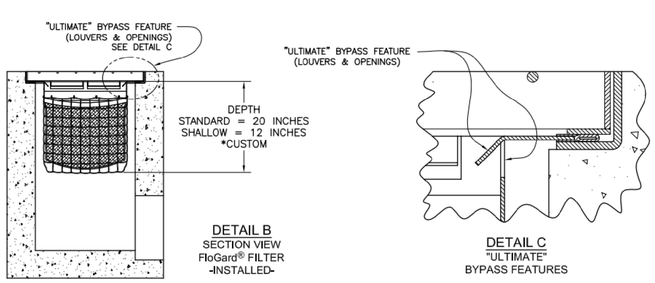


TRASH GATE LATCHES

SCALE: 3" = 1'-0"

01205

4



DETAIL B
SECTION VIEW
FloGard® FILTER
-INSTALLED-

DETAIL C
"ULTIMATE"
BYPASS FEATURES

* MANY OTHER STANDARD & CUSTOM SIZES & DEPTHS AVAILABLE UPON REQUEST.

SPECIFIER CHART

MODEL NO. STANDARD DEPTH	STANDARD & SHALLOW DEPTH (Data in these columns is the same for both STANDARD & SHALLOW versions)			STANDARD DEPTH -20 Inches-		MODEL NO. SHALLOW DEPTH	SHALLOW DEPTH -12 Inches-	
	INLET ID Inside Dimension (inch x inch)	GRATE OD Outside Dimension (inch x inch)	TOTAL BYPASS CAPACITY (cu. ft. / sec.)	SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)		SOLIDS STORAGE CAPACITY (cu. ft.)	FILTERED FLOW (cu. ft. / sec.)
FGP-12F	12 X 12	12 X 14	2.8	0.3	0.4	FGP-12F8	.15	.25
FGP-16F	16 X 16	16 X 19	4.7	0.8	0.7	FGP-16F8	.45	.4
FGP-18F	18 X 18	18 X 20	4.7	0.8	0.7	FGP-18F8	.45	.4
FGP-1824F	16 X 22	18 X 24	5.0	1.5	1.2	FGP-1824F8	.85	.7
FGP-1836F	18 X 36	18 X 40	6.9	2.3	1.6	FGP-1836F8	1.3	.9
FGP-2024F	18 X 22	20 X 24	5.9	1.2	1.0	FGP-2024F8	.7	.55
FGP-21F	22 X 22	22 X 24	6.1	2.2	1.5	FGP-21F8	1.25	.85
FGP-24F	24 X 24	24 X 27	6.1	2.2	1.5	FGP-24F8	1.25	.85
FGP-2430F	24 X 30	26 X 30	7.0	2.8	1.8	FGP-2430F8	1.6	1.05
FGP-2436F	24 X 36	24 X 40	8.0	3.4	2.0	FGP-2436F8	1.95	1.15
FGP-2448F	24 X 48	26 X 48	9.3	4.4	2.4	FGP-2448F8	2.5	1.35
FGP-28F	28 X 28	32 X 32	6.3	2.2	1.5	FGP-28F8	1.25	.85
FGP-30F	30 X 30	30 X 34	8.1	3.6	2.0	FGP-30F8	2.05	1.15
FGP-36F	36 X 36	36 X 40	9.1	4.6	2.4	FGP-36F8	2.65	1.35
FGP-3648F	36 X 48	40 X 48	11.5	6.8	3.2	FGP-3648F8	3.9	1.85
FGP-48F	48 X 48	48 X 54	13.2	9.5	3.9	FGP-48F8	5.45	2.25
FGP-SD24F	24 X 24	28 X 28	6.1	2.2	1.5	FGP-SD24F8	1.25	.85

STORM INLET FILTER

SCALE: NTS

BMP MAP – DETAILS
WQMP-2022-00028
SLOVER AVE AND ALDER AVE
PREPARATION DATE: MARCH 2022
REVISION DATE: NOVEMBER 2023
JOB NUMBER: 10199
PLANS PREPARED BY:

adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

PLOT DATE: 8/21/2025 11:13 PM

U:\PROJECTS\HOME PARADISE\10754 - JOSHUA TREE\ENGINEERING\WQMP\BMP MAP\10754 BMP MAP.DWG

Appendix C:

3.2 INFILTRATION TRENCH

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evapotranspiration (when vegetated), Evaporation
Maximum Drainage Area	10-acres
Other Names	None

Description

Infiltration trenches are shallow excavated areas that are filled with rock material to create a subsurface reservoir layer. The trench is sized to store the design capture volume, V_{BMP}, in the void space between the rocks. Over a period of 72 hours, the stormwater infiltrates through the bottom of the trench into the surrounding soil. Infiltration basins are highly effective in removing all targeted pollutants from stormwater runoff.

Figure 1 shows the components of an infiltration trench. The section shows the reservoir layer and observation well, which is used to monitor water depth. An overflow pipe that is used to bypass flows once the trench fills with stormwater is also shown.

Site Considerations

Location

The use of infiltration trenches may be restricted by concerns over groundwater contamination, soil permeability, and clogging at the site. See the applicable WQMP for any specific feasibility considerations for using infiltration BMPs. Where this BMP is being used, the soil beneath the basin must be thoroughly evaluated in a geotechnical report since the underlying soils are critical to the basin's long term performance. These basins may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur.
- Sites with very low soil infiltration rates.
- Sites with high groundwater tables or excessively high soil infiltration rates, where pollutants can affect groundwater quality.
- Sites with unstabilized soil or construction activity upstream.
- On steeply sloping terrain.
- Infiltration trenches located in a fill condition should refer to Appendix A of this Handbook for details on special requirements/restrictions.

This BMP has a flat surface area, so it may be challenging to incorporate into steeply sloping terrain.

Setbacks

Always consult your geotechnical engineer for site specific recommendations regarding setbacks for infiltration trenches. Recommended setbacks are needed to protect buildings, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process as they affect where infiltration facilities may be placed and how deep they are allowed to be. For instance, depth setbacks can dictate fairly shallow facilities that will have a larger footprint and, in some cases, may make an infiltration trench infeasible. In that instance, another BMP must be selected.

In addition to setbacks recommended by the geotechnical engineer, infiltration trenches must be set back:

- 10 feet from the historic high groundwater mark (measured vertically from the bottom of the trench, as shown in Figure 1)
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the trench, as shown in Figure 1)
- From all mature tree drip lines as indicated in Figure 1
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report.

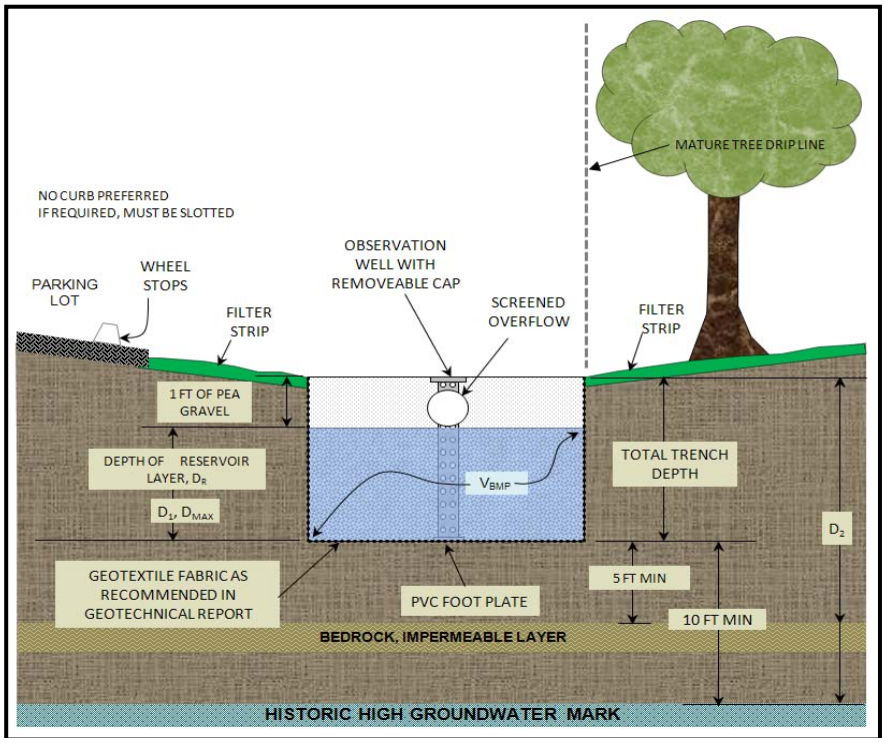


Figure 1 Section View of an Infiltration Trench

Sediment Control

Infiltration BMPs have the risk of becoming plugged over time. To prevent this, sediment must be removed before stormwater enters the trench. Both sheet and concentrated flow types have requirements that should be considered in the design of an infiltration trench.

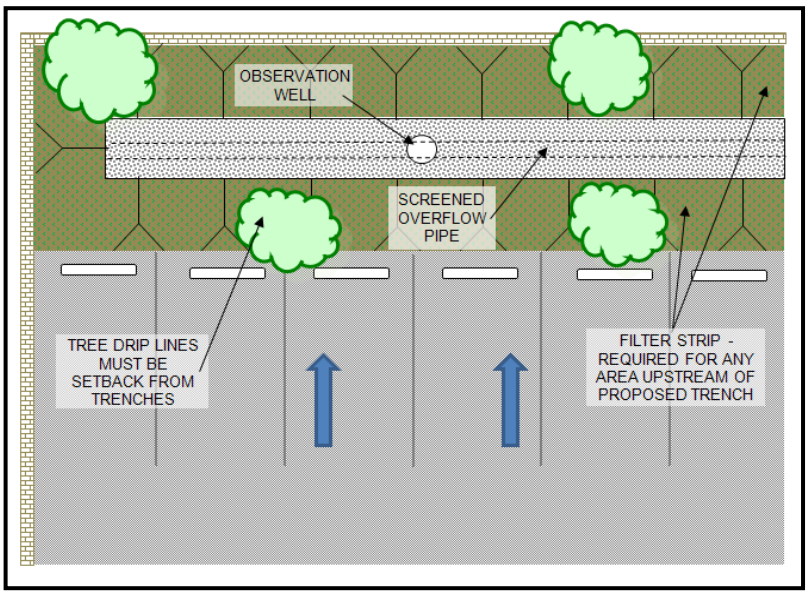


Figure 2 Plan View, Sheet Type Flows

When sheet type flows approach the trench along its length (as illustrated in Figure 2), a vegetated filter strip should be placed between the trench and the upstream drainage area. The filter strip must be a minimum of 5 feet wide and planted with grasses (preferably native) or covered with mulch.

Concentrated flows require a different approach. A 2004 Caltrans BMP Retrofit Report found that flow spreaders recommended in many water quality manuals are ineffective in distributing concentrated flows. As such, concentrated flows should either be directed toward a traditional vegetated swale (as shown on the right side of Figure 3) or to catch basin filters that can remove litter and sediment. Catch basins must discharge runoff as surface flow above the trench; they cannot outlet directly into the reservoir layer of the infiltration trench. If catch basins are used, the short and long term costs of the catch basin filters should be considered.

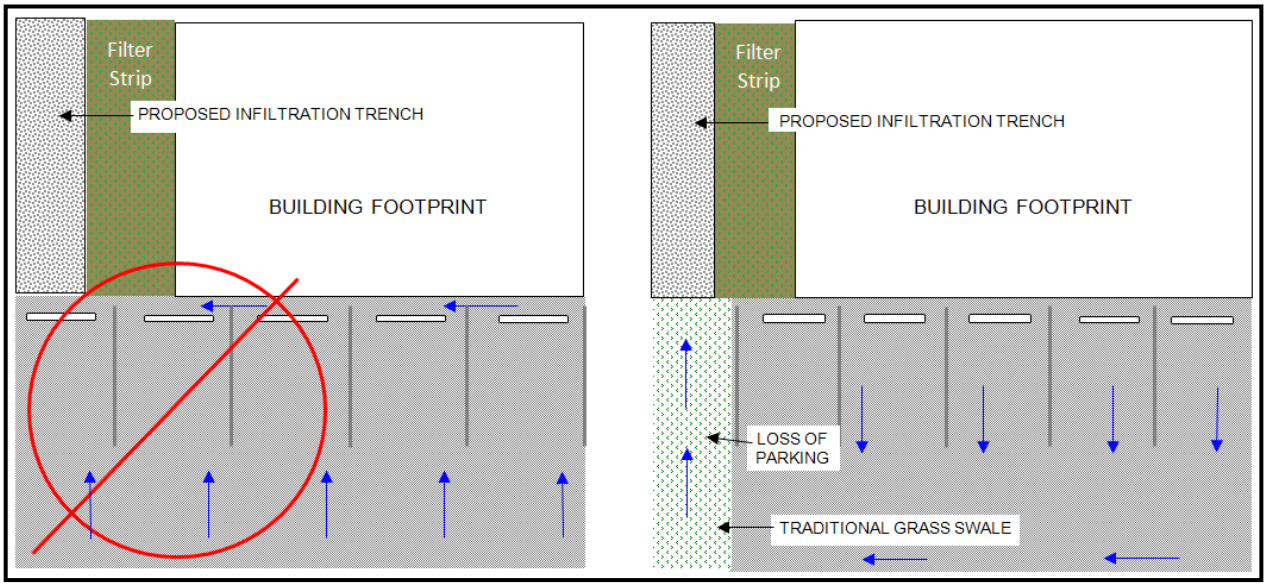


Figure 3 Plan View, Concentrated Flows

Additional Considerations

Class V Status

In certain circumstances, for example, if an infiltration trench is "deeper than its widest surface dimension," or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground, it would probably be considered by the EPA to be a Class V injection well. Class V injection wells are subject to regulations and reporting requirements via the Underground Injection Control (UIC) Program. To ensure that infiltration trenches are not considered Class V wells, the design procedure in this manual requires that the trench not be deeper than it is wide.

Geotechnical Report

A geotechnical report must be included for all infiltration trenches. Appendix A of this Handbook entitled "Infiltration Testing Guidelines", details which types of infiltration tests are acceptable and how many tests or boring logs must be performed. A Geotechnical Report must be submitted in support of all infiltration trenches. Setbacks to walls and foundations must be included in the Geotechnical Report.

Observation Wells

One or more observation wells should be provided. The observation well consists of a vertical section of perforated pipe, 4 to 6 inches in diameter, installed flush with top of trench on a foot plate and have a locking, removable cap.

Overflow

An overflow route is needed to bypass storm flows larger than the V_{BMP} or in the event of clogging. Overflow systems must connect to an acceptable discharge point such as a downstream conveyance system.

Maintenance Access

Normal maintenance of an infiltration trench includes maintenance of the filter strip as well as debris and trash removal from the surface of the trench and filter strip. More substantial maintenance requiring vehicle access may be required every 5 to 10 years. Vehicular access along the length of the swale should be provided to all infiltration trenches. It is preferred that trenches be placed longitudinally along a street or adjacent to a parking lot area. These conditions have high visibility which makes it more likely that the trench will be maintained on a regular basis.

Inspection and Maintenance

Schedule	Inspection and Maintenance Activity
Every two weeks, or as often as necessary to maintain a pleasant appearance	- Maintain adjacent landscaped areas. Remove clippings from landscape maintenance activities. - Remove trash & debris
3 days after Major Storm Events	- Check for surface ponding. If ponding is only above the trench, remove, wash and replace pea gravel. May be needed every 5-10 years. - Check observation well for ponding. If the trench becomes plugged, remove rock materials. Provide a fresh infiltration surface by excavating an additional 2-4 inches of soil. Replace the rock materials.

Design and Sizing Criteria

Design Parameter	Design Criteria
Design Volume	V_{BMP}
Design Drawdown time	72 hrs
Maximum Tributary Drainage Area	10 acres
Maximum Trench Depth	8.0 ft
Width to Depth Ratio	Width must be greater than depth
Reservoir Rock Material	AASHTO #3 or 57 material or a clean, washed aggregate 1 to 3-in diameter equivalent
Filter Strip Width	Minimum of 5 feet in the direction of flow for all areas draining to trench
Filter Strip Slope	Max slope = 1%
Filter Strip Materials	Mulch or grasses (non-mowed variety preferred)
Historic High Groundwater Mark	10 ft or more below bottom of trench
Bedrock/Impermeable Layer Setback	5 ft or more below bottom of trench
Tree Setbacks	Mature tree drip line must not overhang the trench
Trench Lining Material	As recommended in Geotechnical Report

Infiltration Trench Design Procedure

1. Enter the area tributary to the trench, maximum drainage area is 10 acres.

2. Enter the Design Volume, $V_{BMP,}$ determined from Section 2.1 of this Handbook.

3. Enter the site infiltration rate, found in the geotechnical report.

4. Enter the factor of safety from Table 1 of Appendix A, Infiltration Testing.

5. Determine the maximum reservoir layer depth, $D_{MAX.}$ The value is obtained by taking the smaller of two depth equations but may never exceed 8 feet. The first depth, D_1 is related to the infiltration rate of the soil. The second depth, $D_{2,}$ is related to required setbacks to groundwater, bedrock/impermeable layer. These parameters are shown in Figure 1.

   Calculate D_1.

$$D_1 = \frac{I\left({}^{in}/_{hr}\right) \times 72\ (hrs)}{12\left({}^{in}/_{ft}\right) \times {}^{n}/_{100} \times FS}$$

   Where:

   I = site infiltration rate (in/hr), found in the geotechnical report
   FS = factor of safety, refer to Appendix A - Infiltration Testing
   n = porosity of the trench material, 40%

   Calculate D_2. Enter the depth to the seasonal high groundwater and bedrock/impermeable layer measured from the finished grade. The spreadsheet checks the minimum setbacks shown in Figure 1 and selects the smallest value. The equations are listed below for those doing hand calculations.

   Minimum Setbacks (includes 1 foot for pea gravel):

   = Depth to historic high groundwater mark - 11 feet
   = Depth to impermeable layer - 6 feet

   D_2 is the smaller of the two values.

   D_{MAX} is the smaller value of D_1 and $D_{2,}$ and must be less than or equal to 8 feet.

6. Enter the proposed reservoir layer depth, D_R. The value must be no greater than D_{MAX}.

7. Find the required surface area of the trench, A_S. Once D_R is entered, the spreadsheet will calculate the corresponding depth of water and the minimum surface area of the trench.

$$Design\ d_W = D_R \times \left({}^{n}/_{100}\right) \qquad A_S = \frac{V_{BMP}}{Design\ d_W}$$

Where:

A_S = minimum area required (ft^2)
V_{BMP} = BMP storage volume (ft^3)
Design d_W = Depth of water in reservoir layer (ft)

8. Enter the proposed design surface area; it must be greater than the minimum surface area.

9. Calculate the minimum trench width. This is to ensure that EPA's Class V Injection well status is not triggered. The total trench depth (shown in Figure 1) includes the upper foot where the overflow pipe is located. The minimum surface dimension is D_R + 1 foot.

Additional Items

The following items detailed in the preceding sections should also be addressed in the design.

- Sediment Control
- Geotechnical Report
- Observation well(s)
- Overflow

Reference Material

California Stormwater Quality Association. California Stormwater BMP Handbook New Development and Redevelopment. 2003.

County of Los Angeles Department of Public Works. Stormwater BMP Best Management Practice Design and Maintenance Manual for Publicly Maintained Storm Drain Systems. Los Angeles, CA, 2009.

LandSaver Stormwater Management System. Tech Sheet - Porosity of Structural Backfill. 2006.

United States Environmental Protection Agency. Office of Water, Washington D.C. Storm Water Technology Fact Sheet Vegetated Swales. 1999.

United States Environmental Protection Agency. Office of Water. Memorandum on Clarification on Which Stormwater Infiltration Practices/technologies Have the Potential to Be Regulated as "Class V" Wells by Underground Injection Control Program. By Linda Boornazian and Steve Heare. Washington D.C., 2008.

Ventura Countywide Stormwater Quality Management Program. Land Development Guidelines Biofilter Fact Sheet. Ventura, CA, 2001.

Ventura Countywide Stormwater Quality Management Program. Technical Guidance Manual for Stormwater Quality Control Measures. Ventura, CA, 2002.

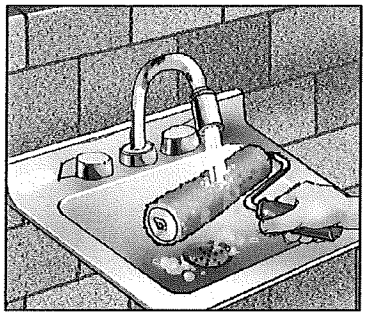
STORMWATER Pollution Prevention

PAINTING

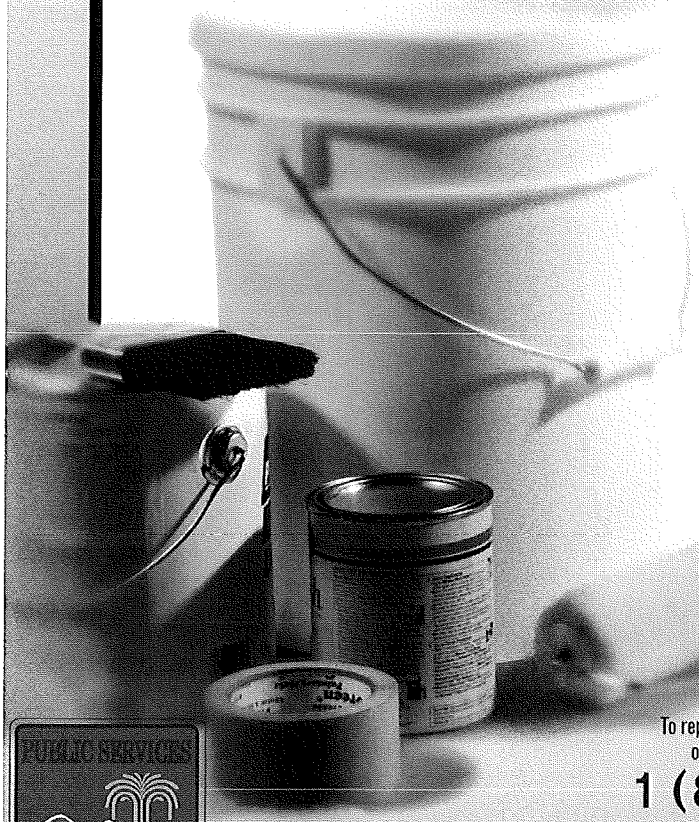
Paints, solvents, adhesives and other toxic chemicals used in painting often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these simple tips to prevent pollution and protect our health.

Water-Based Paints
Use water-based paints whenever possible. They are less toxic than oil-based paints and easier to clean up. Look for products labeled "latex" or "cleans with water."

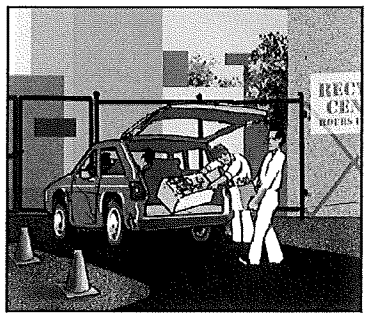
Paint Removal
Sweep up paint stripping residue, chips and dust instead of hosing into the street and dispose of them safely at a household hazardous waste collection facility. Call (800) CLEANUP for the facility in your area.



Painting Cleanup
Never clean brushes or rinse paint containers in the street, gutter or near a storm drain. Clean water-based paints in the sink. Clean oil-based paints with thinner, which can be reused by putting it in a jar to settle out the paint particles and then pouring off the clear liquid for future use. Wrap dried paint residue in newspaper and dispose of it in the trash.



Exterior Paint Removal
When stripping or cleaning building exteriors with high-pressure water, block nearby storm drains and divert washwater onto a designated dirt area. Ask your local wastewater treatment authority if you can collect building cleaning water and discharge it to the sewer.



Recycling Paint
Recycle leftover paint at a household hazardous waste collection facility, save it for touch ups or give it to someone who can use it, like a theatre group, school, city or community organization.

PUBLIC SERVICES
CITY OF FONTANA

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

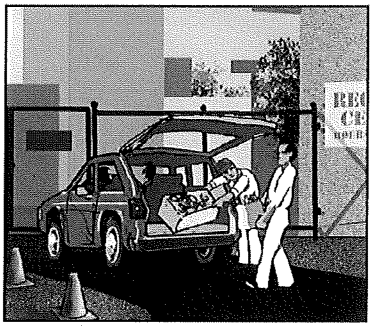
www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

STORMWATER Pollution Prevention

HOME & GARDEN

Yard waste and household toxics like paints and pesticides often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these simple tips to prevent pollution and protect your health.

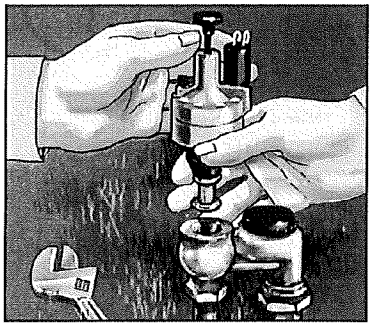


Recycle Household Hazardous Waste
Household products like paint, pesticides, solvents and cleaners are too dangerous to dump and too toxic to trash. Take them to be recycled at a convenient household hazardous waste collection facility. Call (800) CLEANUP for the facility in your area.

Disposing of Yard Waste
Recycle leaves, grass clippings and other yard waste, instead of blowing, sweeping or hosing into the street. Try grasscycling, leaving grass clippings on your lawn instead of using a grass catcher. The clippings act as a natural fertilizer, and because grass is mostly water, it also irrigates your lawn, conserving water.

Use Fertilizers & Pesticides Safely
Fertilizers and pesticides are often carried into the storm drain system by sprinkler runoff. Try using organic or non-toxic alternatives. If you use chemical fertilizers or pesticides, avoid applying near curbs and driveways and never apply before a rain.

Planting in the Yard
Produce less yard waste and save water by planting low maintenance, drought-tolerant trees and shrubs. Using drip irrigation, soaker hoses or micro-spray systems for flower beds and vegetation can also help reduce your water bill and prevent runoff.



Use Water Wisely
Cut your water costs and prevent runoff by controlling the amount of water and direction of sprinklers. The average lawn needs about an inch of water a week, including rainfall, or 10 to 20 minutes of watering. A half-inch per week is enough for fall and spring. Sprinklers should be on long enough to allow water to soak into the ground but not so long as to cause runoff.

PUBLIC SERVICES
CITY OF FONTANA

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

Fertilizer Tips to Prevent Pollution

Water that runs off your lawn and garden can carry excess fertilizer into the San Bernardino County storm drain system, and it does not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these simple tips to prevent pollution and protect your health:

- Read the product label and follow the directions carefully, using only as directed.
- Avoid applying near driveways or gutters.
- Never apply fertilizer before a rain.
- Store fertilizers and chemicals in a covered area and in sealed, waterproof containers.
- Take unwanted lawn or garden chemicals to a household hazardous waste collection facility. Call (800) 253-2687.
- Use non-toxic products for your garden and lawn whenever possible.

To report illegal dumping or for more information on Stormwater pollution prevention, call:

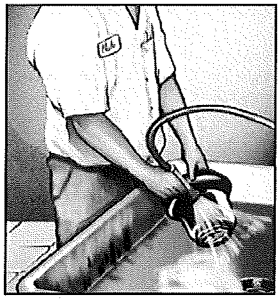
1 (800) CLEANUP

www.1800cleanup.org

STORMWATER Pollution Prevention

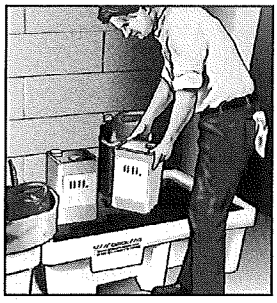
AUTO MAINTENANCE

Oil, grease, anti-freeze and other toxic automotive fluids often make their way into the San Bernardino County storm drain system, and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



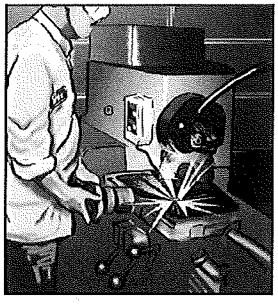
Cleaning Auto Parts

Scrape parts with a wire brush or use a bake oven rather than liquid cleaners. Arrange drip pans, drying racks and drain boards so that fluids are directed back into the parts washer or the fluid holding tank. Do not wash parts or equipment in a shop sink, parking lot, driveway or street.



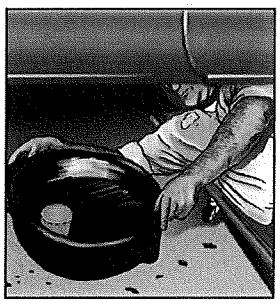
Storing Hazardous Waste

Keep your liquid waste segregated. Many fluids can be recycled via hazardous waste disposal companies if they are not mixed. Store all materials under cover with spill containment or inside to prevent contamination of rainwater runoff.



Metal Grinding and Polishing

Keep a bin under your lathe or grinder to capture metal filings. Send uncontaminated filings to a scrap metal recycler for reclamation. Store metal filings in a covered container or indoors.

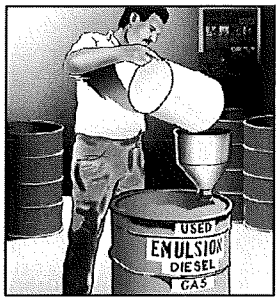


Preventing Leaks and Spills

Place drip pans underneath to capture fluids. Use absorbent cleaning agents instead of water to clean work areas.

Cleaning Spills

Use dry methods for spill cleanup (sweeping, absorbent materials). Follow your hazardous materials response plan, as filed with your local fire department or other hazardous materials authority. Be sure that all employees are aware of the plan and are capable of implementing each phase. To report serious toxic spills, call 911.



Proper Disposal of Hazardous Waste

Recycle used motor oil and oil filters, anti-freeze and other hazardous automotive fluids, batteries, tires and metal filings collected from grinding or polishing auto parts. Contact a licensed hazardous waste hauler. For more recycling information, call (909) 386-8401.

PUBLIC SERVICES
CITY OF FONTANA

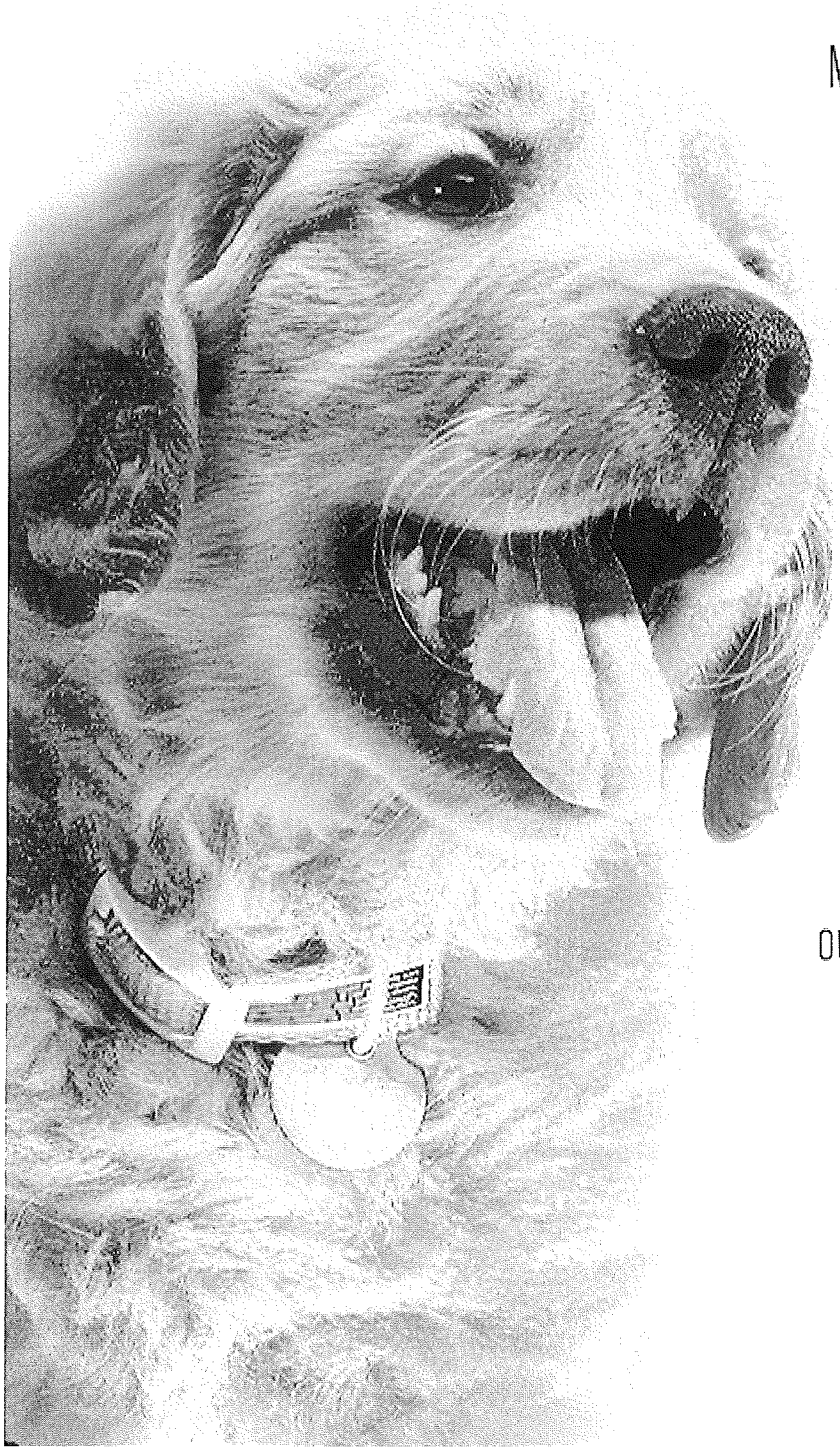
To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

Pick up after your pooch to curb pollution.



Maybe you weren't aware, but dog waste left on the ground gets into storm drains, polluting rivers, lakes and beaches.

The bacteria and risk of disease threatens the health of our kids and communities. Wherever you live in San Bernardino County, this pollution is a problem. The answer? Pick up after your dog, to help prevent pollution and protect our health. It's in your hands.

PUBLIC SERVICES
CITY OF FONTANA

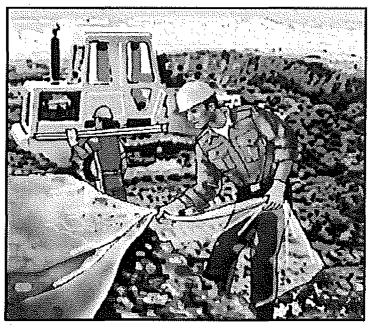
San Bernardino County
STORMWATER PROGRAM

♻ Printed on recycled paper

STORMWATER Pollution Prevention

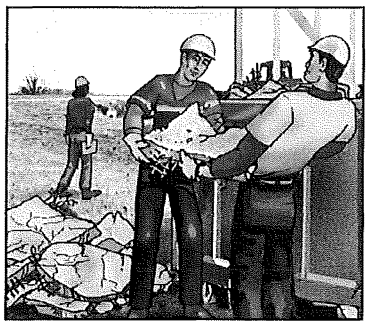
FRESH CONCRETE & MORTAR APPLICATION

Cement wash, sediment, vehicle fluids, dust and hazardous debris from construction sites often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these best management practices to prevent pollution and protect public health.



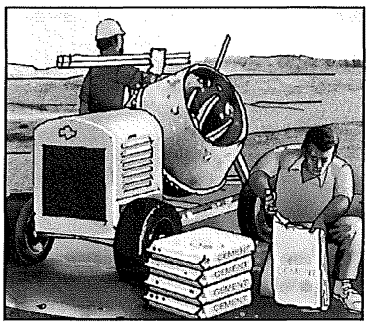
Storing Materials

Keep construction materials and debris away from the street, gutter and storm drains. Secure open bags of cement and cover exposed stockpiles of soil, sand or gravel and excavated material with plastic sheeting, protected from rain, wind and runoff.



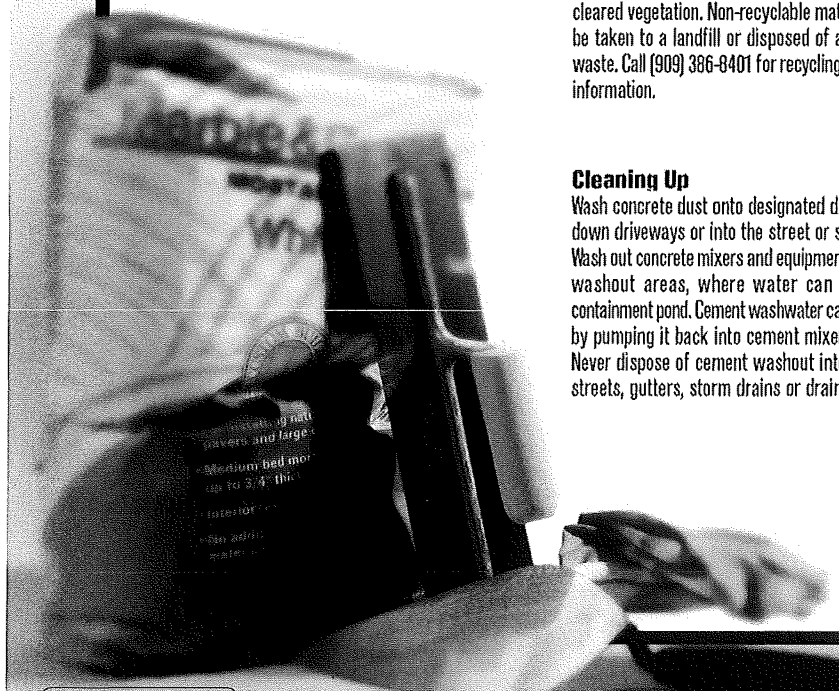
Ordering Materials & Recycling Waste

Reduce waste by ordering only the amounts of materials needed for the job. Use recycled or recyclable materials whenever possible. When breaking up paving, recycle the pieces at a crushing company. You can also recycle broken asphalt, concrete, wood, and cleared vegetation. Non-recyclable materials should be taken to a landfill or disposed of as hazardous waste. Call (909) 386-8401 for recycling and disposal information.



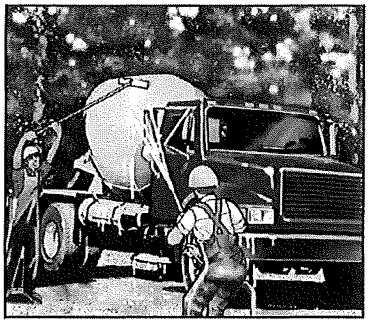
During Construction

Schedule excavation and grading during dry weather. Prevent mortar and cement from entering the street and storm drains by placing erosion controls. Setup small mixers on tarps or drop cloths, for easy cleanup of debris. Never bury waste material. Recycle or dispose of it as hazardous waste.



Cleaning Up

Wash concrete dust onto designated dirt areas, not down driveways or into the street or storm drains. Wash out concrete mixers and equipment in specified washout areas, where water can flow into a containment pond. Cement washwater can be recycled by pumping it back into cement mixers for reuse. Never dispose of cement washout into driveways, streets, gutters, storm drains or drainage ditches.



PUBLIC SERVICES
CITY OF FONTANA

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

STORMWATER Pollution Prevention

HOME REPAIR & REMODELING

Paints, solvents, adhesives and other toxic substances used in home repair and remodeling often make their way into the San Bernardino County storm drain system and do not get treated before reaching the Santa Ana River. This pollutes our drinking water and contaminates waterways, making them unsafe for people and wildlife. Follow these simple tips to prevent pollution and protect your health.

Construction Projects

Keep construction debris away from the street, gutter and storm drains. Schedule grading and excavation projects for dry weather. Cover excavated material and stockpiles of soil, sand or gravel, protected from rain, wind and runoff. Prevent erosion by planting fast-growing annual and perennial grass, which can shield and bind soil.

Recycle Household Hazardous Waste

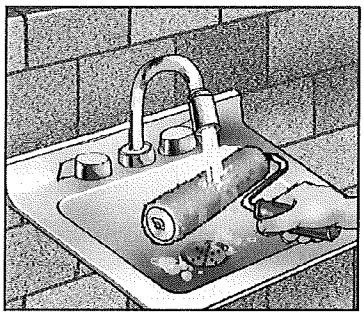
Household cleaners, paint and other home improvement products like wallpaper and tile adhesives are too toxic to trash. Recycle them instead, at a convenient household hazardous waste collection facility. Call (800) CLEANUP for the facility in your area.

Landscaping & Gardening

Avoid applying fertilizers or pesticide near curbs and driveways, and store covered, protected from rain, wind and runoff. Try using organic or non-toxic alternatives. Reduce runoff and lower your water bill by using drip irrigation, soaker hoses or micro-spray systems. Recycle leaves instead of blowing, sweeping or raking them into the street, gutter or storm drain.

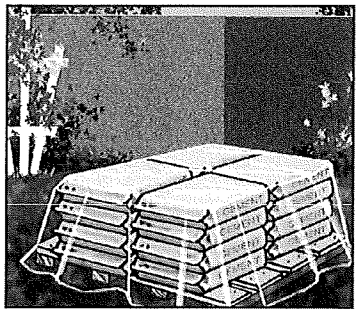
Paint Removal

Paint stripping residue, chips and dust from marine paints and paints containing lead or tributyl tin are hazardous wastes. Sweep them up instead of hosing into the street and dispose of them safely at a household hazardous waste collection facility.



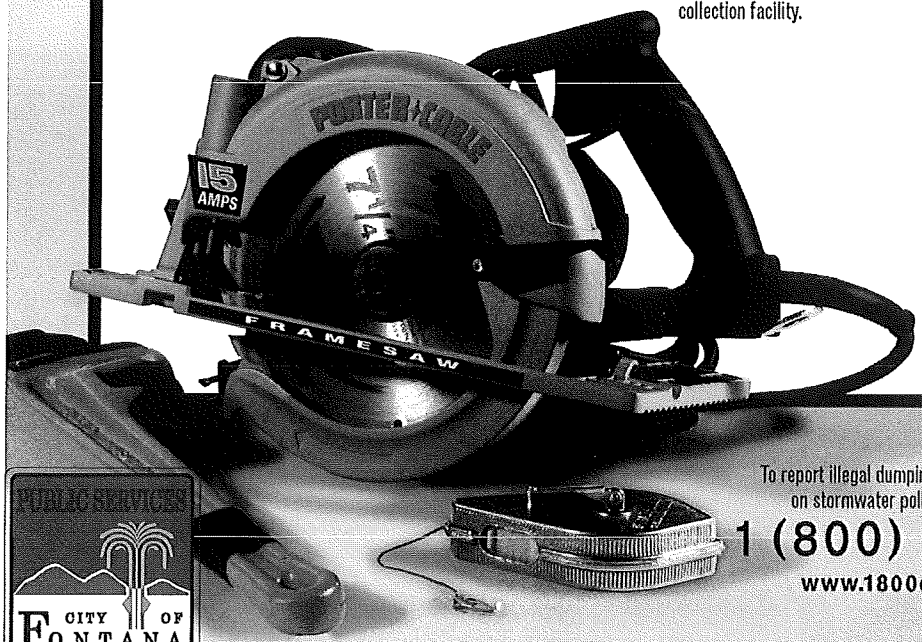
Painting Cleanup

Avoid cleaning brushes or rinsing paint containers in the street, gutter or near a storm drain. Clean water-based paints in the sink. Clean oil-based paints with thinner, which you can filter and reuse. Recycle leftover paint at a household hazardous waste collection facility, save it for touch ups or give it to someone who can use it, like a theatre group, school, city or community organization.



Concrete and Masonry

Store bags of cement and plaster away from gutters and storm drains, and cover them to protect against rain, wind and runoff. Sweep or scoop up cement washout or concrete dust instead of hosing into driveways, streets, gutters or storm drains.



PUBLIC SERVICES
CITY OF FONTANA

To report illegal dumping or for more information on stormwater pollution prevention, call:

1 (800) CLEANUP

www.1800cleanup.org

San Bernardino County STORMWATER PROGRAM

Site Design & Landscape Planning SD-10

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Roof Runoff Controls SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Efficient Irrigation SD-12

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

GEOTECHNICAL INVESTIGATION

PROPOSED JOSHUA TREE ESTATES

SEC EAST BROADWAY STREET & LAFERNEY AVENUE

APN 0605-051-01

JOSHUA TREE AREA

SAN BERNARDINO COUNTY, CALIFORNIA

-Prepared By-

Sladden Engineering

45090 Golf Center Parkway, Suite F
Indio, California 92201
(760) 863-0713

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, California 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863
www.sladdenengineering.com

January 5, 2023

Project No. 544-22471
23-01-005

Four Star Realty
c/o Ms. Kim Chen
2939 Leward Avenue, Unit 201
Los Angeles, California 90005

Subject: Geotechnical Investigation

Project: Proposed Joshua Tree Estates
SEC East Broadway Street & Laferney Avenue
APN 0605-051-01
Joshua Tree Area
San Bernardino County, California

Sladden Engineering is pleased to present the results of the geotechnical investigation performed for the 32 lot residential development proposed for the subject parcel (APN 0605-051-01) located on the southeast corner of East Broadway Street and Laferney Avenue in the Joshua Tree area of San Bernardino County, California. Our services were completed in accordance with our proposal for geotechnical engineering services dated October 21, 2022 and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site to provide recommendations for foundation design and the design of the various site improvements. Evaluation of environmental issues and hazardous wastes was not included within the scope of services provided.

The opinions, recommendations and design criteria presented in this report are based on our field exploration program, laboratory testing and engineering analyses. Based on the results of our investigation, it is our professional opinion that the proposed project should be feasible from a geotechnical perspective provided that the recommendations presented in this report are implemented in design and carried out through construction.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

SER/mc

Copies: 2/Addressee

GEOTECHNICAL INVESTIGATION
PROPOSED JOSHUA TREE ESTATES
SEC EAST BROADWAY STREET & LAFERNEY AVENUE
APN 0605-051-01
JOSHUA TREE AREA
SAN BERNARDINO COUNTY, CALIFORNIA

TABLE OF CONTENTS

INTRODUCTION 1
PROJECT DESCRIPTION 1
SCOPE OF SERVICES 2
SITE CONDITIONS 2
GEOLOGIC SETTING 3
SUBSURFACE CONDITIONS 3
SEISMICITY AND FAULTING 4
SITE-SPECIFIC GROUND MOTION PARAMETERS 5
GEOLOGIC HAZARDS 5
CONCLUSIONS 7
EARTHWORK AND GRADING 7
- Site Clearing 7
- Preparation of Building Areas 8
- Compaction 8
- Shrinkage and Subsidence 9

CONVENTIONAL SHALLOW SPREAD FOOTINGS 9
SLABS-ON-GRADE 10
RETAINING WALLS 10
CORROSION SERIES 11
PRELIMINARY PAVEMENT DESIGN 11
UTILITY TRENCH BACKFILL 11
EXTERIOR CONCRETE FLATWORK 11
DRAINAGE 12
LIMITATIONS 12
ADDITIONAL SERVICES 12
REFERENCES 13

FIGURES -	Site Location Map
	Regional Geologic Map
	Exploration Location Plan
	Fault Zone Map
APPENDIX A	Field Exploration
APPENDIX B	Laboratory Testing
APPENDIX C	Seismic Design Map and Report
	Site-Specific Ground Motion Parameters

INTRODUCTION

This report presents the results of the geotechnical investigation performed by Sladden Engineering (Sladden) for the 32 lot residential subdivision proposed for the project site (APN 0605-051-01) located on the southeast corner of East Broadway Street and Laferney Avenue in the Joshua Tree area of San Bernardino County, California. The central portion of the site is located at approximately 34.1623 degrees north latitude and 116.2690 degrees west longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).

Our investigation was conducted to evaluate the engineering properties of the subsurface materials, to evaluate their *in-situ* characteristics, and to provide engineering recommendations and design criteria for site preparation, foundation design and the design of various site improvements. This study also includes a review of published and unpublished geotechnical and geological literature regarding seismicity at and near the subject site.

PROJECT DESCRIPTION

It is our understanding that the proposed project will consist of constructing a 32 lot residential development on the subject parcel. Each proposed residential lot will consist of approximately 2 acres. Concrete flatwork, landscape areas and various associated site improvements are also anticipated. Private on-site sewage disposal systems consisting of septic tanks and leach lines are proposed to serve each lot. For our analyses we expect that the proposed residential structures will consist of a relatively lightweight wood-frame structures supported on conventional shallow spread footings and concrete slabs on grade.

Sladden expects that grading will be limited to minor cuts and fills to accomplish the desired elevations and to provide adequate gradients for site drainage. This does not include the removal and re-compaction of the loose surface soil and primary foundation bearing soil within the proposed building pad areas. Upon completion of precise grading plans, Sladden should be retained in order to verify that the recommendations presented within in this report are properly incorporated into the design of the proposed project.

Structural foundation loads were not available at the time of this report. Based on our experience with relatively lightweight wood-frame structures, we expect that isolated column loads will be less than 20 kips and continuous wall loads will be less than 2.0 kips per linear foot. If these assumed loads vary significantly from the actual loads, we should be consulted to verify the applicability of the recommendations provided.

SCOPE OF SERVICES

The purpose of our investigation was to determine specific engineering characteristics of the surface and near surface soil in order to develop foundation design criteria and recommendations for site preparation. Exploration of the site was achieved by drilling 17 exploratory bores and 17 shallow percolation test holes to depths between approximately 5 and 26 feet below the existing ground surface (bgs). Specifically, our site characterization consisted of the following tasks:

- Site reconnaissance to assess the existing surface conditions on and adjacent to the site.
- Excavating 17 exploratory boreholes and 17 shallow percolation test holes to depths between approximately 5 and 26 feet bgs in order to characterize the surface soil conditions. Representative samples of the soil were classified in the field and retained for laboratory testing and engineering analyses.
- Performing laboratory testing on selected samples to evaluate their engineering characteristics.
- Reviewing geologic literature and discussing geologic hazards.
- Performing engineering analyses to develop recommendations for foundation design and site preparation.
- The preparation of this report summarizing our work at the site.

SITE CONDITIONS

The project site is located on the southeast corner of East Broadway Street and Laferney Avenue in the Joshua Tree area of San Bernardino County, California. The project site consists of a single parcel that is formally identified by the County of San Bernardino County as APN 0605-051-01. The parcel occupies approximately 80 acres of undeveloped land. Surface gradients descend to the northeast with elevations ranging from approximately 2,520 to 2,475 feet above mean sea level descending from southwest to northeast. A shallowly incised drainage course transects the site from approximately Lot 12 northeast to Lot 32. The site is near the elevation of the adjacent properties and roadways and is located at approximately 34.1623 degrees north latitude and 116.2690 degrees west longitude (Figure 1). The parcel is bounded by East Broadway Street to the north, Laferney Avenue to the west, Sunever Road to the east and undeveloped land to the immediate south.

Based on our review of the Joshua Tree North 7.5-Minute Quadrangle Map (USGS, 2018), the site is situated at elevations ranging from approximately 2,520 to 2,475 feet above mean sea level (MSL) from southwest to northeast, respectively.

No natural ponding of water or surface seeps were observed at or near the site during our investigations conducted on November 22, 2022 and December 15, 2022. Site drainage appears to be controlled via sheet flow, surface infiltration and through shallowly drainage courses transecting the site. No "blue line" streams are mapped on the property. The closest "blue line" stream is located approximately 2,000 feet to the northwest of the site.

GEOLOGIC SETTING

The site is located within the Transverse Ranges Geomorphic province. The Transverse Ranges are characterized by roughly east-west trending, convergent (north-south compressional) deformational structural features. The convergent deformational features of the Transverse Ranges are a result of north-south crustal shorting due to plate tectonics, locally folding and uplifting of the mountains and lowering of the intervening valleys, along with propagation of thrust faults (including blind thrusts) and in filling of the valley basins with sediments. The Transverse Ranges are considered to be one of the most rapidly rising orogenic regions on earth.

The site has been mapped by Dibblee (1967) to be immediately underlain by alluvium (Qa). The regional geologic setting for the site vicinity is presented on the Regional Geologic Map (Figure 2).

SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated by drilling 17 exploratory boreholes and 17 percolation test holes to depths between approximately 5 and 26 feet bgs. The approximate exploratory bore and test hole locations are illustrated on the Exploration Location Plan (Figure 3). The borehole were advanced using a truck mounted drill-rig (Mobile B-61) equipped with 8-inch outside diameter hollow stem augers. A representative of Sladden was on-site to log the materials encountered and retrieve samples for laboratory testing and engineering analyses.

During our field investigation, alluvium consisting of silty sand (SM) and sand (SW/SM) was encountered to a maximum explored depth of 26 feet bgs. Generally, the alluvial materials appeared yellowish brown to grayish brown, dry to slightly moist, loose to very dense, and fine- to coarse-grained with gravel.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in Appendix A of this report. The stratification lines represent the approximate boundaries between soil types although the transitions may be gradual.

Groundwater was not encountered during our field investigation. Information regarding the approximate depth to groundwater provided by the California Department of Water Resources online database indicates that the historic high depth to groundwater is in excess of 200 feet below the existing ground surface in the vicinity of the site. The following table provides a summary of the recorded groundwater depths in the project vicinity.

TABLE 1
GROUNDWATER DEPTHS

STATE WELL	LAT/LONG	DISTANCE (KM)	DATE	DEPTH (FT)
01N07E17Q001S	34.165/-116.2736	0.50	05/03/1994	Dry Well
01N07E16P001S	34.1656/-116.2578	1.10	04/20/1968	262.7
01N07E21Q001S	34.1506/ -116.2528	1.98	04/16/1947	286.9
01N07E20P002S	34.1524/-116.2738	1.20	05/11/2006	375
01N07E21J001S	34.1539/-116.25	2.00	04/25/1956	258.7
01N07E22E001S	34.1572/-116.2475	2.05	03/27/1958	259.08

SEISMICITY AND FAULTING

The southwestern United States is a tectonically active and structurally complex region, dominated by northwest trending dextral faults. The faults of the region are often part of complex fault systems, composed of numerous subparallel faults which splay or step from main fault traces. Strong seismic shaking could be produced by any of these faults during the design life of the proposed project.

We consider the most significant geologic hazard to the project to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of the project. The proposed project is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a "sufficiently active and well defined fault" that has exhibited surface displacement within the Holocene epoch (about the last 11,000 years). A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

As previously stated, the site has been subjected to strong seismic shaking related to active faults that traverse through the region. Some of the more significant seismic events near the subject site within recent times include: M6.0 North Palm Springs (1986), M6.1 Joshua Tree (1992), M7.3 Landers (1992), M6.2 Big Bear (1992), M7.1 Hector Mine (1999) and 7.1 Ridgecrest (2019).

Table 2 lists the closest known potentially active faults that was generated in part using the EQFAULT computer program (Blake, 2000), as modified using the fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003), Southern Earthquake Data Center (SCEDC, 2023) and the Quaternary Fault and Fold Database of the United States (USGS, 2023a). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any of the other faults in the region.

TABLE 2
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance (Km)	Maximum Event
Pinto Mountain	2.0	7.27*
Emerson So. Copper Mountain	5.1	7.0
Eureka Peak	12.2	6.7
Burnt Mountain	13.3	6.7
Landers	13.6	7.3
Pisgah – Bullion Mtn. – Mesquite Lk	18.9	7.3
Calico – Hidalgo	21.8	7.3
Johnson Valley (Northern)	23.8	6.7
North Frontal Fault Zone (East)	26.4	6.7
San Andreas – Southern	32.5	7.5
San Andreas – Coachella	32.5	7.5
San Andreas – San Bernardino	32.7	7.5

*USGS Earthquake Scenario Map (BSSC 2014)

SITE SPECIFIC GROUND MOTION PARAMETERS

Sladden has reviewed the 2023 California Building Code (CBC) and ASCE7-16 and developed site specific ground motion parameters for the subject site. The project site-specific ground motion parameters are summarized in the following table and included within Appendix C. The project Structural Engineer should verify that all design parameters provided are applicable for the subject project.

TABLE 3
GROUND MOTION PARAMETERS

Latitude / Longitude	34.1623/-116.2690
Risk Category	II
Site Class	D
Code Reference Documents	ASCE 7-16; Chapter 11 & 21

Description	Type	Map Based	Site-Specific
MCE_R Ground Motion (0.2 second period)	S_S	1.96	---
MCE_R Ground Motion (1.0 second period)	S_1	0.714	---
Site-Modified Spectral Acceleration Value	S_{MS}	1.96	**2.266**
Site-Modified Spectral Acceleration Value	S_{M1}	null	**1.788**
Numeric Seismic Design Value at 0.2 second SA	S_{DS}	1.307	**1.511**
Numeric Seismic Design Value at 1.0 second SA	S_{D1}	null	**1.192**
Site Amplification Factor at 0.2 second	F_a	1	**1**
Site Amplification Factor at 1.0 second	F_v	null	**2.5**
Site Peak Ground Acceleration	PGA_M	0.929	**0.858**

GEOLOGIC HAZARDS

The subject site is located in an active seismic zone and will likely experience strong seismic shaking during the design life of the proposed project. In general, the intensity of ground shaking will depend on several factors including: the distance to the earthquake focus, the earthquake magnitude, the response characteristics of the underlying materials, and the quality and type of construction. Geologic hazards and their relationship to the site are discussed below.

I. Surface Rupture. Surface rupture is expected to occur along preexisting, known active fault traces. However, surface rupture could potentially splay or step from known active faults or rupture along unidentified traces. Based on our review of Dibblee (1967), Jennings (1994), and CDMG (1998), known faults are not mapped on or projecting towards the site. The subject parcel is not located in a State of California delineated fault zone (Figure 4). In addition, no signs of active surface faulting were observed during our review of non-stereo digitized photographs of the site and site vicinity (Google Earth, 2023). Finally, no signs of active surface fault rupture or secondary seismic effects (lateral spreading, lurching etc.) were identified during our field investigation. Therefore, it is our opinion that risks associated with primary surface ground rupture should be considered "low".

II. Ground Shaking. The site has been subjected to past ground shaking by faults that traverse through the region. Strong seismic shaking from nearby active faults is expected to produce strong seismic shaking during the design life of the proposed project. The site modified peak ground acceleration is estimated to be 0.858g.

III. Liquefaction. Liquefaction is the process in which loose, saturated granular soil loses strength as a result of cyclic loading. The strength loss is a result of a decrease in granular sand volume and a positive increase in pore pressures. Generally, liquefaction can occur if all of the following conditions apply; liquefaction susceptible soil, groundwater within a depth of 50 feet or less, and strong seismic shaking.

Based on the depth to groundwater in the project vicinity, risks associated with liquefaction are considered "negligible".

IV. Tsunamis and Seiches. Because the site is situated at an inland location and is not immediately adjacent to any impounded bodies of water, risk associated with tsunamis and seiches is considered "negligible".

V. Slope Failure, Land Sliding, Rock Falls. No signs of slope instability in the form of landslides, rock falls, earthflows or slumps were observed at or near the subject site. The site is located on relatively level ground and not immediately adjacent to any hillsides. Based on our field observations of the site vicinity, risks associated with slope instability should be considered "negligible".

VI. Expansive Soil. Generally, the surface soil consists of silty sand (SM) and sand (SW/SM). Based on the results of our laboratory testing (EI=0), the materials underlying the site are considered to have a "negligible" expansion potential.

VII. Static Settlement. Static settlement resulting from the anticipated foundation loads should be tolerable provided that the recommendations included in this report are considered in foundation design and construction. The ultimate static settlement is expected to be less than 1 inch when using the recommended allowable bearing pressures. As a practical matter, differential static settlement between footings can be assumed as one-half of the total settlement.

VIII. Subsidence. Land subsidence can occur in valleys where aquifer systems have been subjected to extensive groundwater pumping, such that groundwater pumping exceeds groundwater recharge. Generally, pore water reduction can result in a rearrangement of skeletal grains and could result in elastic (recoverable) or inelastic (unrecoverable) deformation of an aquifer system.

Locally, no fissures or other surficial evidence of subsidence were observed at or near the subject site. The potential for subsidence related settlement is considered "negligible".

IX. Debris Flows. Debris flows are viscous flows consisting of poorly sorted mixtures of sediment and water and are generally initiated on slopes steeper than approximately six horizontal to one vertical (6H:1V) (Boggs, 2001). Based on the flat nature of the site and the composition of the surface soil, we judge that the risks associated with debris flows should be considered "negligible".

X. Flooding and Erosion. No signs of flooding or erosion were observed during our field investigation. Risks associated with flooding and erosion should be evaluated and mitigated by the project design Civil Engineer.

CONCLUSIONS

Based on the results of our investigation, it is our professional opinion that the project should be feasible from a geotechnical perspective provided that the recommendations included in this report are incorporated into design and carried out through construction. The main geotechnical concern is the presence of loose and potentially compressible native surface soil throughout the project site.

We recommend remedial work within the proposed new building areas including over-excavation and re-compaction of the primary foundation bearing soil. Specific recommendations for foundation area preparation are presented in the Earthwork and Grading section of this report.

Caving did occur to varying degrees within each of our exploratory bores and the surface soil may be susceptible to caving within deeper excavations. All excavations should be constructed in accordance with the normal CalOSHA excavation criteria. Based on our observations of the materials encountered, we anticipate that the subsoil will conform to that described by CalOSHA as Type C. Soil conditions should be verified in the field by a "Competent person" employed by the Contractor.

The following recommendations present more detailed design criteria that have been developed based on our field and laboratory investigation.

EARTHWORK AND GRADING

All earthwork including excavation, backfill and preparation of the primary foundation and/or slab bearing soil should be performed in accordance with the geotechnical recommendations presented in this report and portions of the local regulatory requirements, as applicable. All earth work should be performed under the observation and testing of a qualified soil engineer. The following geotechnical engineering recommendations for the proposed project are based on observations from the field investigation program, laboratory testing and geotechnical engineering analyses.

a. Site Clearing: Areas to be graded should be cleared of any existing vegetation, root systems and debris. All areas scheduled to receive fill should be cleared of old fills and any irreducible matter. The unsuitable materials should be removed off site. Voids left by obstructions should be properly backfilled in accordance with the compaction recommendations of this report.

b. Preparation of Building Areas: To provide firm and uniform foundation bearing conditions, we recommend over-excavation and re-compaction throughout the proposed building areas. All artificial fill soil and low density near surface native soil should be removed to a depth of approximately 3 feet below existing grade or 2 feet below the bottom of the footings, whichever is deeper. Remedial grading should extend laterally a minimum of five feet beyond the building perimeter. The native soil exposed by over-excavation should be scarified, moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction prior to fill placement. The previously removed soil may then be replaced as engineered fill as recommended below.

c. Compaction: Soil to be used as engineered fill should be free of organic material, debris, and other deleterious substances, and should not contain irreducible matter greater than three inches in maximum dimension. All fill materials should be placed in thin lifts, not exceeding six inches in a loose condition. If import fill is required, the material should be of a low to non-expansive nature and should meet the following criteria:

Plastic Index	Less than 12
Liquid Limit	Less than 35
Percent Soil Passing #200 Sieve	Between 15% and 35%
Maximum Aggregate Size	3 inches

The subgrade soil and all fill material should be compacted with acceptable compaction equipment to at least 90 percent relative compaction. The exposed subgrade soil should be observed by a representative of Sladden Engineering prior to fill placement. Compaction testing should be performed on all lifts in order to ensure proper placement of the fill materials. Table 4 provides a summary of the excavation and compaction recommendations.

TABLE 4
SUMMARY OF RECOMMENDATIONS

*Remedial Grading	Over-excavation and re-compaction within the building envelopes and extending laterally 5 feet beyond the building limits and to a minimum depth of 3 feet below existing grade or 2 feet below the bottom of the footings, whichever is deeper.
Native / Import Engineered Fill	Place in thin lifts not exceeding 6 inches in a loose condition, compact to a minimum of 90 percent relative compaction within 2 percent of the optimum moisture content.

*Actual depth may vary and should be determined by a representative of Sladden Engineering in the field during construction.

d. Shrinkage and Subsidence: Volumetric shrinkage of the material that is excavated and replaced as controlled compacted fill should be anticipated. We estimate that this shrinkage should be between 10 and 15 percent. Subsidence of the surfaces that are scarified and compacted should be between 1 tenth and 2 tenths of a foot. This will vary depending upon the type of equipment used, the moisture content of the soil at the time of grading and the actual degree of compaction attained.

CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional shallow spread footings are expected to provide adequate support for the proposed residential structures. All footings should be founded upon properly compacted engineered fill soil and should have a minimum embedment depth of 12 inches measured from the lowest adjacent finished grade. Continuous and isolated pad footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous and isolated pad footings supported upon properly compacted engineered fill soil may be designed using allowable bearing pressures of 1800 and 2000 pounds per square foot (psf), respectively. Allowable increases of 200 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth may be used if desired. The maximum allowable bearing pressure should be 2500 psf. The allowable bearing pressures apply to combined dead and sustained live loads. The allowable bearing pressures may be increased by one-third when considering transient live loads, including seismic and wind forces.

Based on the recommended allowable bearing pressures, the total static settlement of the conventional shallow spread footings is anticipated to be less than one-inch provided that foundation area preparation conforms to the recommendations included in this report. Static differential settlement is anticipated to be approximately one-half of the total static settlement for similarly loaded footings spaced up to approximately 50 feet apart.

Lateral load resistance for the shallow spread footings will be developed by passive pressure against the sides of the footings below grade and by friction acting at the base of the footings. An allowable passive pressure of 250 psf per foot of depth may be used for design purposes. An allowable coefficient of friction 0.45 may be used for dead and sustained live loads to compute the frictional resistance of the footing placed directly on compacted fill. Under seismic and wind loading conditions, the passive pressure and frictional resistance may be increased by one-third.

All footing excavations should be observed by a representative of the project geotechnical consultant to verify adequate embedment depths prior to placement of forms, steel reinforcement or concrete. The excavations should be trimmed neat, level and square. All loose, disturbed, sloughed or moisture-softened soils and/or any construction debris should be removed prior to concrete placement. Excavated soil generated from footing and/or utility trenches should not be stockpiled within the building envelope or in areas of exterior concrete flatwork. All footings should be reinforced in accordance with the project Structural Engineer's recommendations.

SLABS-ON-GRADE

To provide uniform and adequate support, concrete slabs-on-grade must be placed on properly compacted engineered fill soil as outlined in the previous sections of this report. The slab subgrades should remain near optimum moisture content and should not be permitted to dry prior to concrete placement. Slab subgrades should be firm and unyielding. Loose and/or disturbed soil should be removed and replaced with engineered fill soil compacted to a minimum of 90 percent relative compaction.

Slab thickness and reinforcement should be determined by the Structural Engineer. We recommend a minimum slab thickness of 4.0 inches and minimum reinforcement of #3 bars at 24 inches on center in both directions. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height. Final floor slab design and reinforcement should be determined by the Structural Engineer.

Slabs with moisture sensitive surfaces should be underlain with a moisture vapor retarder consisting of a polyvinyl chloride membrane such as 10-mil visqueen, or equivalent. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface can not be achieved by grading, consideration should be given to placing a thin leveling course of sand across the pad surface prior to placement of the membrane.

RETAINING WALLS

Minor retaining walls may be required to accomplish the proposed construction. Cantilever retaining walls may be designed using "active" pressures. Active pressures may be estimated using an equivalent fluid weight of 35 pcf for gently sloping (less than 3H:1V) native backfill soil acting in a triangular pressure distribution with drained backfill conditions. For steeper slopes, an active equivalent fluid pressure of 55 pcf should be used. "At Rest" pressures should be utilized for restrained walls. At rest pressures may be estimated using an equivalent fluid weight of 55 pcf for native backfill soil with level drained backfill conditions. At rest pressures should be increased to 75 pcf for sloped backfill conditions.

We recommend that a back drain system be provided behind all retaining walls or that the walls be designed for full hydrostatic pressures. The back drains should consist of a heavy walled, four inch diameter, perforated pipe sloped to drain to outlets by gravity, and of clean, free-draining, three-quarter to one and one-half inch crushed rock or gravel. The crushed rock or gravel should extend to within one foot of the surface. The upper one foot should be backfilled with compacted, fine-grained soil to exclude surface water. A Mirafi 140N (or equivalent) filter cloth should be placed between the on-site native material and the drain rock.

We recommend that the ground surface behind retaining walls be sloped to drain. Under no circumstances should the surface water be diverted into back drains. Where migration of moisture through walls would be detrimental, the walls should be waterproofed.

CORROSION SERIES

The soluble sulfate concentrations of the surface soil were determined to be 80 parts per million (ppm). The soil is considered to have a "negligible- S0" corrosion potential with respect to concrete. The use of Type V cement and special sulfate resistant concrete mixes should not be necessary.

The pH levels of the surface soil was determined to be 8.7. Based on soluble chloride concentration testing (30 ppm) the soil is considered to have a "negligible - C0" corrosion potential with respect to normal grade steel. The minimum resistivity of the surface soil was found to be 7,900 ohm-cm, that suggests the site soil is considered to have a "low" corrosion potential with respect to ferrous metal installations. A corrosion expert should be consulted regarding appropriate corrosion protection measures for corrosion sensitive installations.

PRELIMINARY PAVEMENT DESIGN

Asphalt concrete pavements should be designed in accordance with Topic 610 of the Caltrans Highway Design Manual based on R-Value and Traffic Index. The R-Value of the near surface soil is expected to be in excess of 60. On-site soil and any imported soil should be tested after grading for R-Value prior to establishing final pavement design sections. For on-site pavement design, a Traffic Index (TI) of 6.5 was used in design. We recommend a pavement section of 3.0 inches of asphalt concrete (AC) over 4.0 inches of Class II Aggregate Base (AB).

Asphalt concrete should conform to applicable sections of the latest editions of the Standard Specifications for Public Works Construction (Greenbook) or Caltrans Standard Specifications. Aggregate base material should conform to Section 26 of the Caltrans Standard Specifications or Greenbook, latest edition. Subgrade should be compacted to at least 90 percent relative compaction and aggregate base material should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D 1557.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum of 90 percent relative compaction. Trench backfill materials should be placed in lifts no greater than six inches in a loose condition, moisture conditioned (or air-dried) as necessary to achieve near optimum moisture content, and mechanically compacted in place to a minimum of 90 percent relative compaction. A representative of the project soil engineer should test the backfill to verify adequate compaction.

EXTERIOR CONCRETE FLATWORK

To minimize cracking of concrete flatwork, the subgrade soil below concrete flatwork areas should first be compacted to a minimum of 90 percent relative compaction. A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soil prior to concrete placement.

DRAINAGE

All final grades should be provided with positive gradients away from foundations to provide rapid removal of surface water runoff to an adequate discharge point. No water should be allowed to be pond on or immediately adjacent to foundation elements. In order to reduce water infiltration into the subgrade soil, surface water should be directed away from building foundations to an adequate discharge point. Site drainage should be evaluated upon completion of the precise grading plans and in the field during grading.

LIMITATIONS

The findings and recommendations presented in this report are based upon an interpolation of the soil conditions between the exploratory locations and extrapolation of these conditions throughout the proposed building areas. Should conditions encountered during grading appear different than those indicated in this report, this office should be notified.

The use of this report by other parties or for other projects is not authorized. The recommendations of this report are contingent upon monitoring of the grading operation by a representative of Sladden Engineering. All recommendations are considered to be tentative pending our review of the grading operation and additional testing, if indicated. If others are employed to perform any soil testing, this office should be notified prior to such testing in order to coordinate any required site visits by our representative and to assure indemnification of Sladden Engineering.

We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to assure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

ADDITIONAL SERVICES

Once completed, final project plans and specifications should be reviewed by use prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. Following review of plans and specifications, observation should be performed by the Soil Engineer during construction to document that foundation elements are founded on/or extend into the properly compacted soil, and that suitable backfill soil is placed upon competent materials and properly compacted at the recommended moisture content.

Tests and observations should be performed during grading by the Soil Engineer or his representative in order to verify that the grading is being performed in accordance with the project specifications. Field density testing shall be performed in accordance with acceptable ASTM test methods. The minimum acceptable degree of compaction should be 90 percent for engineered fill soil and 95 percent for Class II aggregate base as obtained by ASTM Test Method D1557. Where testing indicates insufficient density, additional compactive effort shall be applied until retesting indicates satisfactory compaction.

REFERENCES

Blake, T., 2000, EQFAULT and EQSEARCH, Computer Programs for Deterministic and Probabilistic Prediction of Peak Horizontal Acceleration from Digitized California Faults.

Boggs, S. Jr., 2001, "Principles of Sedimentology and Stratigraphy", Prentice Hall, third edition

Building Seismic Safety Council (BSSC), 2014, Earthquake Scenario Event Set webpage; available at: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=14d2f75c7c4f4619936dac0d14e1e468

California Building Code (CBC), 2022, California Building Standards Commission.

California Department of Conservation (CDOC), 2023, Regulatory Maps; available at: https://maps.conservation.ca.gov/cgs/informationwarehouse/

California Department of Water Resources (CDWR), 2023, Historical Data by Well-Map Interface, available at : https://wdl.water.ca.gov/waterdatalibrary/

California Division of Mine and Geology (CDMG), 1998, State of California, Special Studies Zones, Joshua Tree North Quadrangle; Effective March 1, 1998.

Cao T., Bryant, W.A., Rowshandel B., Branum D., Wills C.J., 2003, "The Revised 2002 California Probabilistic Seismic Hazard Maps".

Dibblee, T.W., 1967, Geologic Map of the Joshua Tree Quadrangle, San Bernardino and Riverside Counties, California; Map I-516.

Engineering Solutions, 2022, Joshua Tree Estates, Tentative Tract; Sheet 1 of 1.

GoogleEarth.com, 2023, Vertical Aerial Photograph for the Joshua Tree area, California, Undated, Variable Scale.

Jennings, Charles W. (Compiler), 1994, Fault Activity Map of California and Adjacent Areas, California Division of Mines and Geology, Geologic Data Map No. 6

San Bernardino County Land Use Services Zoning Look-up (LUSZL), 2023, available at: https://sbcounty.maps.arcgis.com/apps/Solutions/s2.html?appid=f696b169b4334997942ab899899b6d4e

Southern California Earthquake Data Center (SCEDC), 2023, Significant Earthquakes and Faults; available at: https://scedc.caltech.edu/earthquake/significant.html

Structural Engineer Association (SEA), 2023, Seismic Design Maps; available at: https://seismicmaps.org/

United States Geological Survey (USGS), 2018, Joshua Tree North 7.5 Minute Quadrangle Map, 1:24000.

REFERENCES
(Continued)

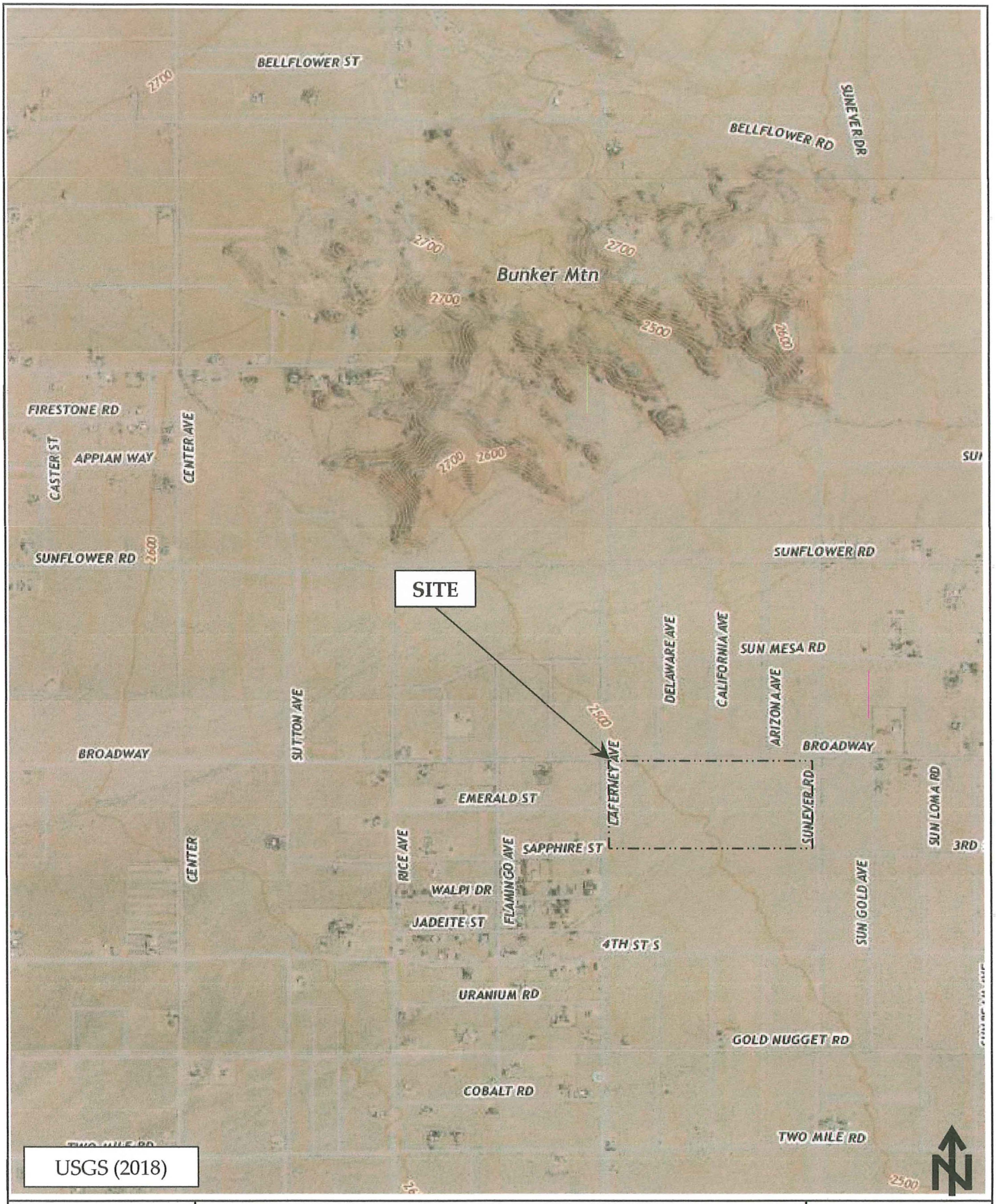
United States Geological Survey (USGS), 2023a, Quaternary Fault and Fold Database; available at: https://geohazards.usgs.gov/hazards/interactive/

United States Geological Survey (USGS), 2023b, Risk-Targeted Ground Motion Calculator; available at: https://earthquake.usgs.gov/designmaps/rtgm/

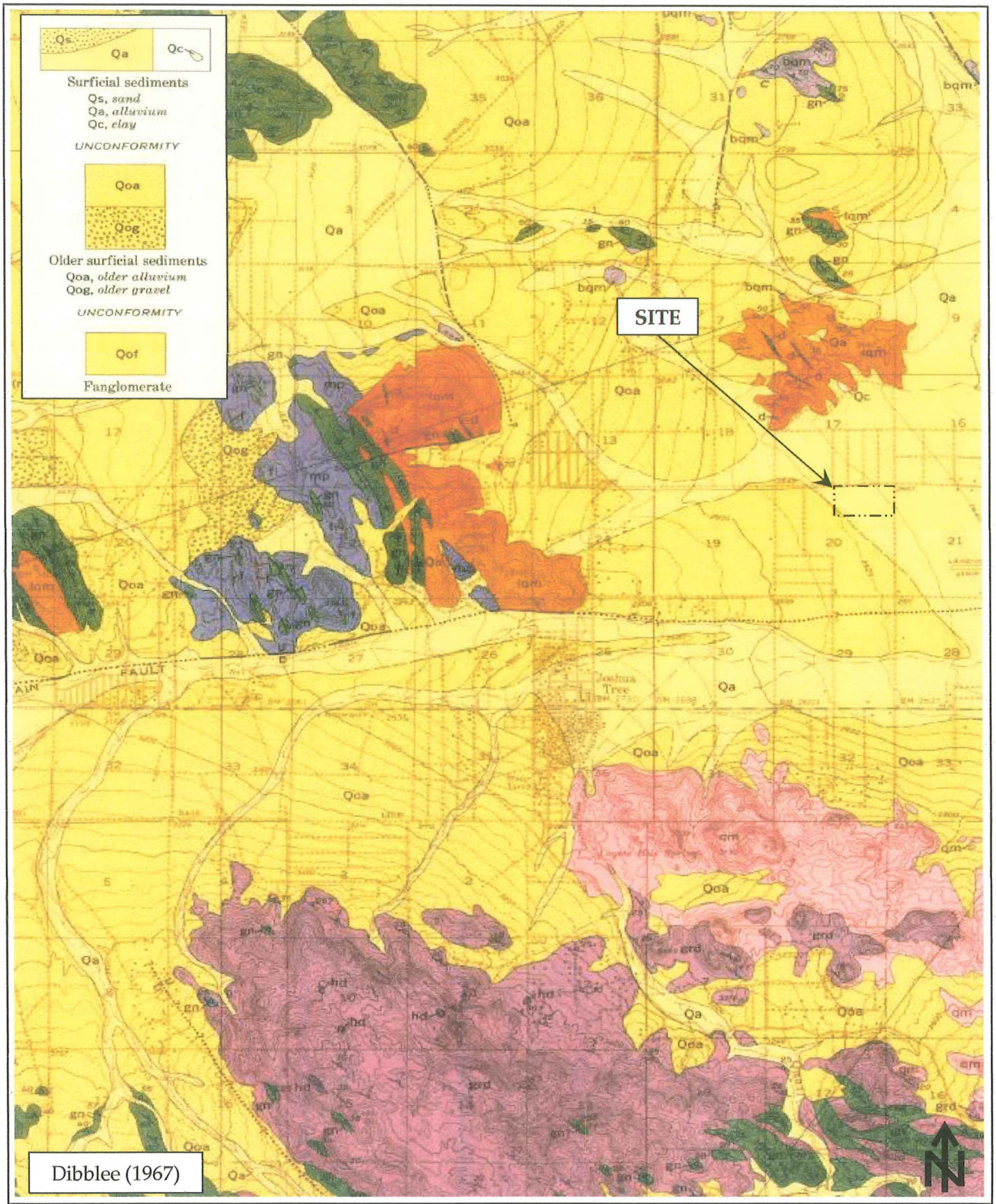
United States Geological Survey (USGS), 2023c, Unified Hazard Tool; available at: https://earthquake.usgs.gov/hazards/interactive/

FIGURES

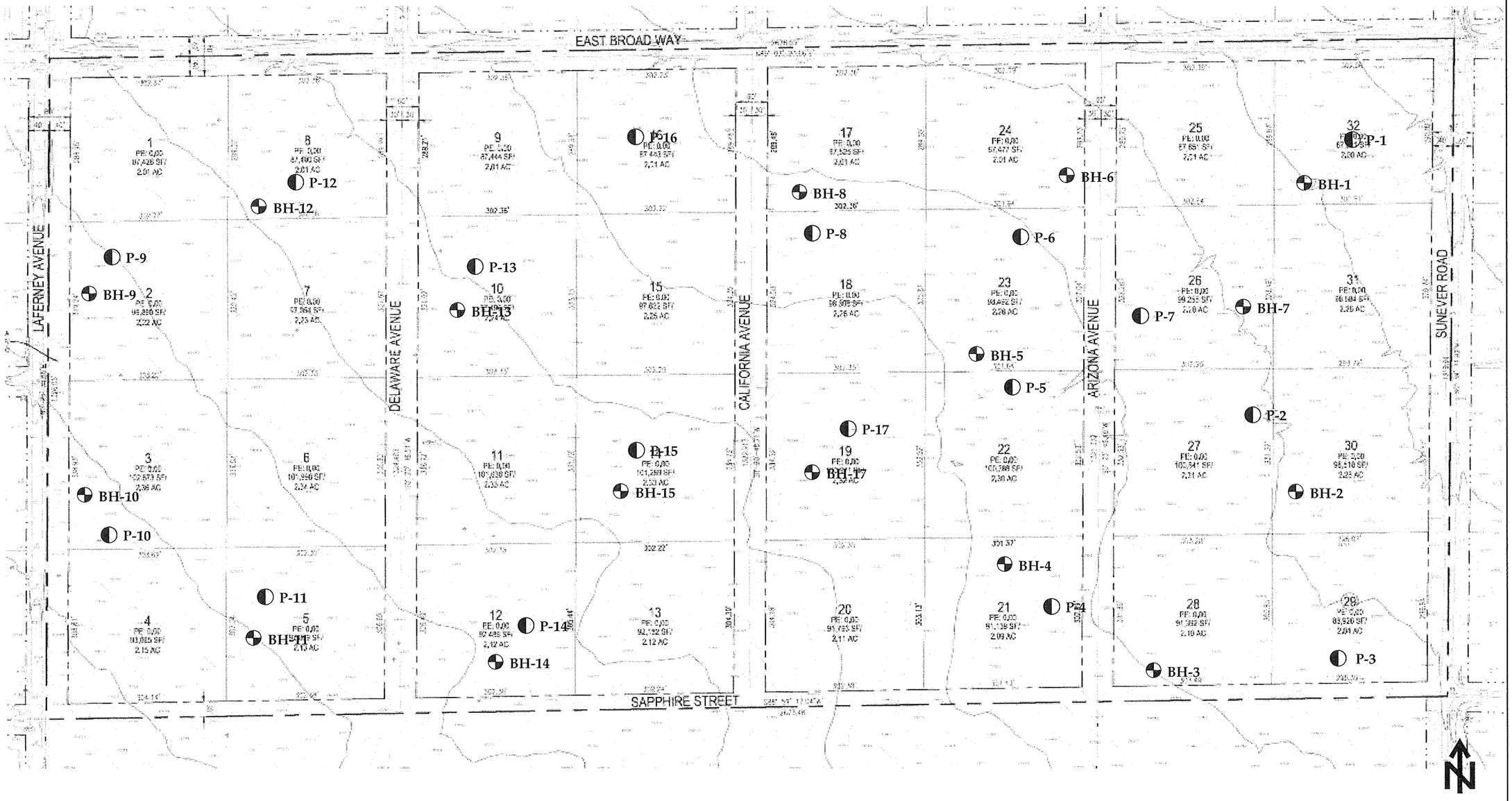
SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
EXPLORATION LOCATION PLAN
FAULT ZONE MAP



Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 544-22471	
	Report Number: 23-01-005	
	Date: January 5, 2023	



	REGIONAL GEOLOGIC MAP		FIGURE
Sladden Engineering	Project Number:	544-22471	2
	Report Number:	23-01-005	
	Date:	January 5, 2023	



LEGEND	
BH-17	Borehole Location
P-17	Percolation Test Location

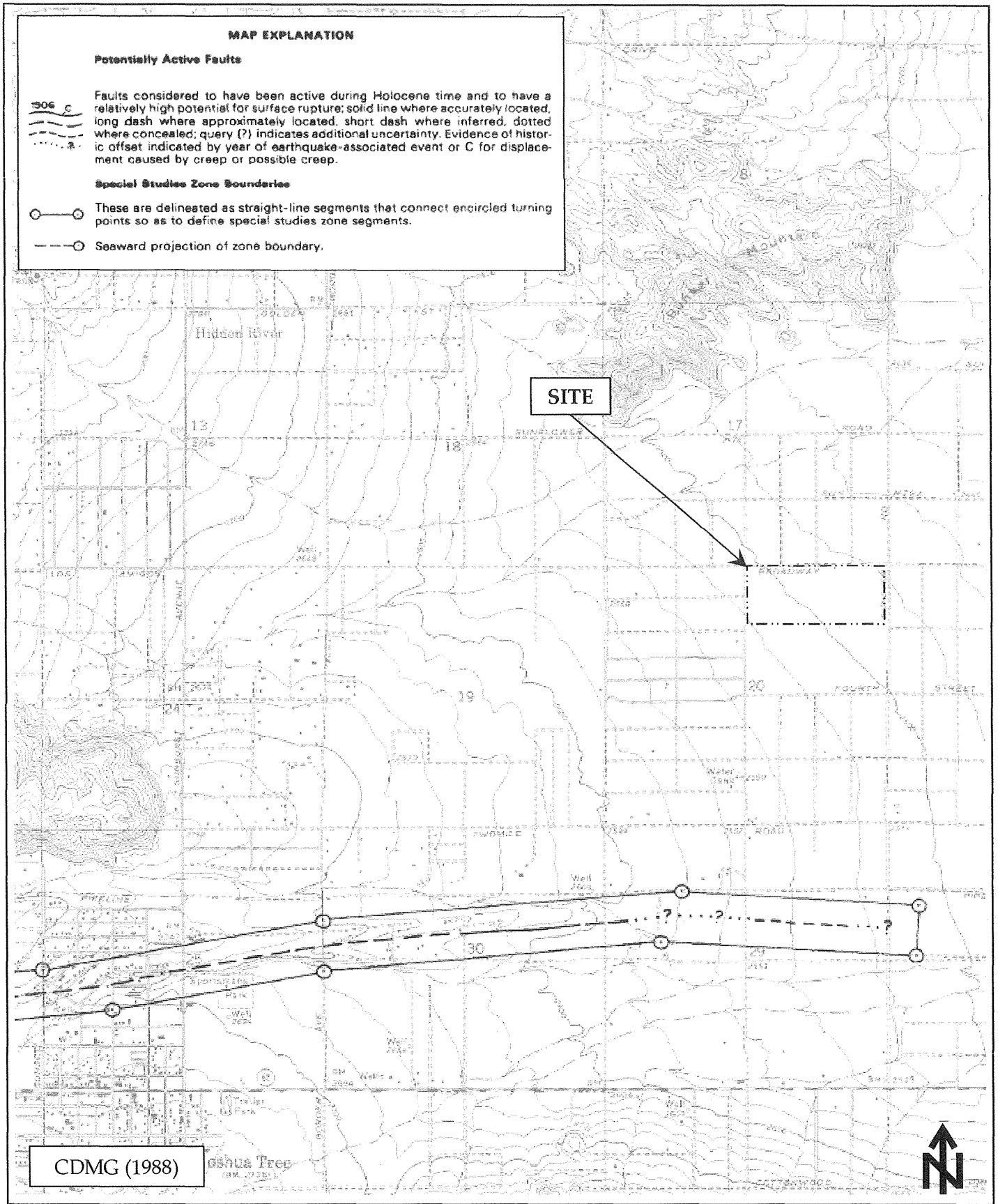
Sladden Engineering

EXPLORATION LOCATION PLAN

Project Number:	544-22471
Report Number:	23-01-005
Date:	January 5, 2023

FIGURE

3



Sladden Engineering	FAULT ZONE MAP	FIGURE 4
	Project Number:	544-22471
	Report Number:	23-01-005
	Date:	January 5, 2023

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation 17 exploratory bores and 17 percolation test holes were excavated on November 22, 2022 and December 15, 2022 utilizing a truck mounted drill-rig (Mobile B-61) equipped with 8-inch outside diameter (O.D.) hollow stem augers and a track-mounted excavator equipped with a 24-inch wide bucket and solid stem auger attachment. Continuous logs of the materials encountered were made by a representative of Sladden Engineering. Materials encountered in the boreholes were classified in accordance with the Unified Soil Classification System that is presented in this appendix.

Representative undisturbed samples were obtained within our bores by driving a thin-walled steel penetration sampler (California split spoon sampler) or a Standard Penetration Test (SPT) sampler with a 140 pound automatic-trip hammer dropping approximately 30 inches (ASTM D1586). The number of blows required to drive the samplers 18 inches was recorded in 6-inch increments and blowcounts are indicated on the boring logs.

The California samplers are 3.0 inches in diameter, carrying brass sample rings having inner diameters of 2.5 inches. The standard penetration samplers are 2.0 inches in diameter with an inner diameter of 1.5 inches. Undisturbed samples were removed from the sampler and placed in moisture sealed containers in order to preserve the natural soil moisture content. Bulk samples were obtained from the excavation spoils and samples were then transported to our laboratory for further observations and testing.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			TYPICAL NAMES	
COARSE GRAINED SOILS MORE THAN HALF IS LARGER THAN No.200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN No.4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY-GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN No.4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF IS SMALLER THAN No.200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, CLEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS: LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

EXPLANATION OF BORE LOG SYMBOLS

California Split-spoon Sample

Unrecovered Sample

Standard Penetration Test Sample

Groundwater depth

Note: The stratification lines on the borelogs represent the approximate boundaries between the soil types; the transitions may be gradual.

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
■	7 11 15	1	0	14.0	1.0	114.2	2		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	10 12 13			14.8	1.2	108.1	6		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	4 5 6			9.9	1.2		10		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
■	16 29 38			6.5	0.6	117.2	16		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained (Qa).
■	6 9 15			17.7	1.9		20		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	27 43 55			3.2	0.5		26		Sand (SW); yellowish brown, dry, very dense, fine- to coarse-grained with calcium carbonate stringers (Qa).
							28		Terminated at ~26.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	5 6 7			19.3	1.7		6		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
	6 14 18			14.4	1.0	108.9	10		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	12 14 14			6.5	1.0		16		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
							18		Terminated at ~16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	6 7 8			2.4	0.3		6		Sand (SW); yellowish brown, dry, loose, fine- to coarse-grained with gravel (Qa).
	9 11 21			7.1	1.5		10		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
	12 26 34			5.6	0.9	115.9	16		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
	16 18 20			8.7	1.4		20		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
							22		Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	3 4 4			13.9	2.3		6		Silty Sand (SM); yellowish brown, dry, loose, fine- to coarse-grained with gravel (Qa).
	5 11 16			7.1	0.9	107.5	10		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
							12		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	12 20 22			4.8	0.6		6		Sand (SW); yellowish brown to grayish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	5 6 8			9.5	1.0		10		Sand (SW); yellowish brown to grayish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	8 11 28			2.5	0.3		16		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	9 11 14			5.6	0.8		20		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	19 33 29			3.5	0.4		26		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
							28		Terminated at ~26.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-6

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
■	12 17 24			17.4	1.1	112.3	4 6 8		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	7 9 12			6.9	0.9		10 12 14		Sand (SP); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
■	12 16 21			4.0	0.4	115.0	16		Sand (SP); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
							18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50		Terminated at ~16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-7

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	5 6 8			8.4	0.8		6		Sand (SP); grayish brown, dry, medium dense, fine- to coarse-grained (Qa).
	10 14 17			14.2	1.0	121.0	10		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	10 16 18			5.6	0.6		16		Sand (SP); grayish brown to yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
	16 22 27			5.4	0.4	111.1	20		Sand (SP); grayish brown to yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
							22		Terminated at ~16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-8

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	13 26 23			6.7	0.4	121.9	6		Sand (SP); yellowish brown to grayish brown, dry, dense, fine- to coarse-grained (Qa).
	4 8 9			10.1	1.0		10		Sand (SW); grayish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
							12		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-9

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~7.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-10

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~7.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-11

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Silty Sand (SM) to Sand (SP); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~8.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-12

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Sand (SP); grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		
							10		Terminated at ~8.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-13

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~8.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-14

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~9.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-15

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~8.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-16

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~6.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-17

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~7.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-6

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-7

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-8

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-9

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-10

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-11

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471

Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-12

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471

Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-13

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-14

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-15

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-16

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-17

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-005

APPENDIX B

LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Representative bulk soil samples were obtained in the field and returned to our laboratory for additional observations and testing. Laboratory testing was generally performed in two phases. The first phase consisted of testing in order to determine the compaction of the existing natural soil and the general engineering classifications of the soils underlying the site. This testing was performed in order to estimate the engineering characteristics of the soil and to serve as a basis for selecting samples for the second phase of testing. The second phase consisted of soil mechanics testing. This testing including consolidation, shear strength and expansion testing was performed in order to provide a means of developing specific design recommendations based on the mechanical properties of the soil.

CLASSIFICATION AND COMPACTION TESTING

Maximum Density-Optimum Moisture Determinations: Representative soil types were selected for maximum density determinations. This testing was performed in accordance with the ASTM Standard D1557, Test Method A. Graphic representations of the results of this testing are presented in this appendix. The maximum densities are compared to the field densities of the soil in order to determine the existing relative compaction to the soil.

Classification Testing: Soil samples were selected for classification testing. This testing consists of mechanical grain size analyses. This provides information for developing classifications for the soil in accordance with the Unified Soil Classification System which is presented in the preceding appendix. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing is very useful in detecting variations in the soil and in selecting samples for further testing.

SOIL MECHANIC'S TESTING

Expansion Testing: One (1) bulk sample was selected for Expansion testing. Expansion testing was performed in accordance with the UBC Standard 18-2. This testing consists of remolding 4-inch diameter by 1-inch thick test specimens to a moisture content and dry density corresponding to approximately 50 percent saturation. The samples are subjected to a surcharge of 144 pounds per square foot and allowed to reach equilibrium. At that point the specimens are inundated with distilled water. The linear expansion is then measured until complete.

Direct Shear Testing: One (1) bulk sample was selected for Direct Shear testing. This test measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation design and lateral design. Tests were performed using a recompacted test specimen that was saturated prior to tests. Tests were performed using a strain controlled test apparatus with normal pressures ranging from 800 to 2300 pounds per square foot.

Corrosion Series Testing: The soluble sulfate concentrations of the surface soil were determined in accordance with California Test Method Number (CA) 417. The pH and Minimum Resistivity were determined in accordance with CA 643. The soluble chloride concentrations were determined in accordance with CA 422.

Sladden Engineering
450 Egan Avenue, Beaumont CA 92223 (951) 845-7743 Fax (951) 845-8863

Maximum Density/Optimum Moisture

ASTM D698/D1557

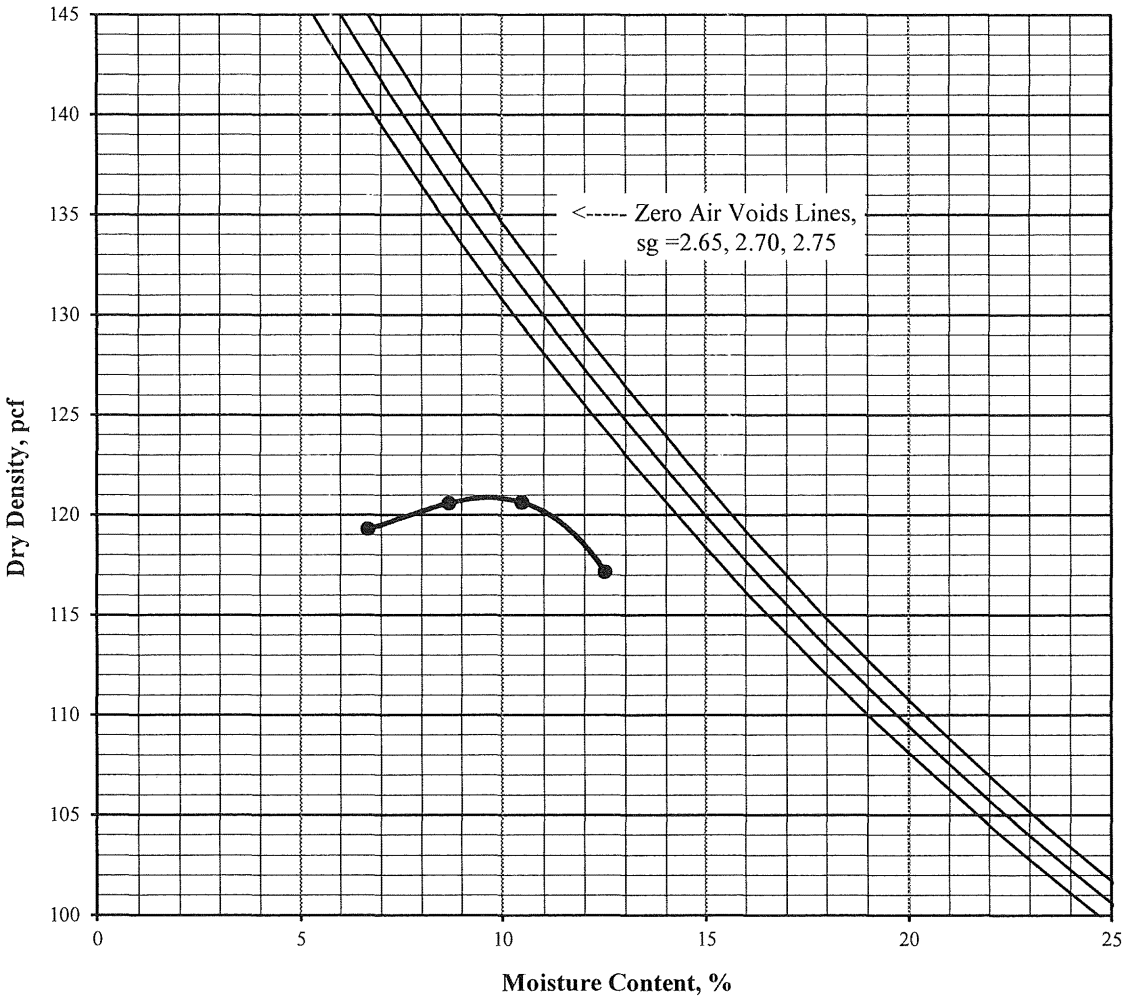
Project Number: 544-22471
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample Location: BH-1 Bulk 1 @ 0-5'
Description: Brown Sand w/Silt (SW-SM)

December 30, 2022

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 121 pcf
Optimum Moisture: 10%

Sieve Size	% Retained
3/4"	
3/8"	
#4	1.6



Sladden Engineering
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Expansion Index

ASTM D 4829

Job Number: 544-22471
Job Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-1 Bulk 1 @ 0-5'
Soil Description: Brown Sand w/Silt (SW-SM)

December 30, 2022

Wt of Soil + Ring:	577.6
Weight of Ring:	188.6
Wt of Wet Soil:	389.0
Percent Moisture:	8.9%
Sample Height, in	0.95
Wet Density, pcf:	124.5
Dry Denstiy, pcf:	114.3

% Saturation:	50.7

Expansion **Rack # 3**

Date/Time	12/23/2022	10:50 AM
Initial Reading	0.0000	
Final Reading	0.0002	

Expansion Index **0**

(Final - Initial) x 1000

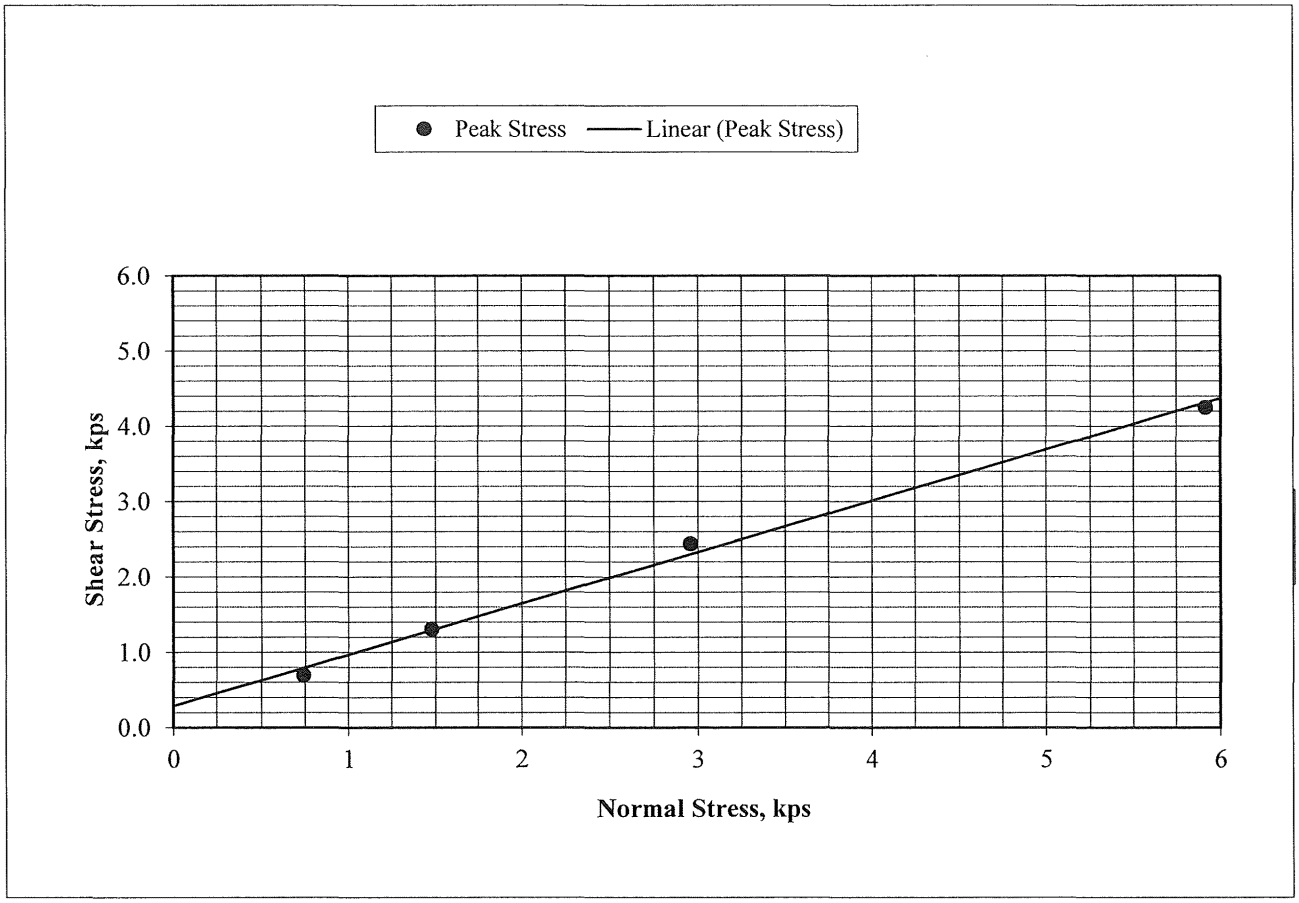
Sladden Engineering

450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Direct Shear ASTM D 3080-04
(modified for unconsolidated condition)

Job Number:	544-22471		December 30, 2022
Job Name	East Broadway	Initial Dry Density:	109.0 pcf
Lab ID No.	LN6-22566	Initial Mosture Content:	10.1 %
Sample ID	BH-1 Bulk 1 @ 0-5'	Peak Friction Angle (Ø):	34°
Classification	Brown Sand w/Silt (SW-SM)	Cohesion (c):	290 psf
Sample Type	Remolded @ 90% of Maximum Density		

Test Results	1	2	3	4	Average
Moisture Content, %	14.6	14.6	14.6	14.6	14.6
Saturation, %	72.2	72.2	72.2	72.2	72.2
Normal Stress, kps	0.739	1.479	2.958	5.916	
Peak Stress, kps	0.698	1.308	2.442	4.251	



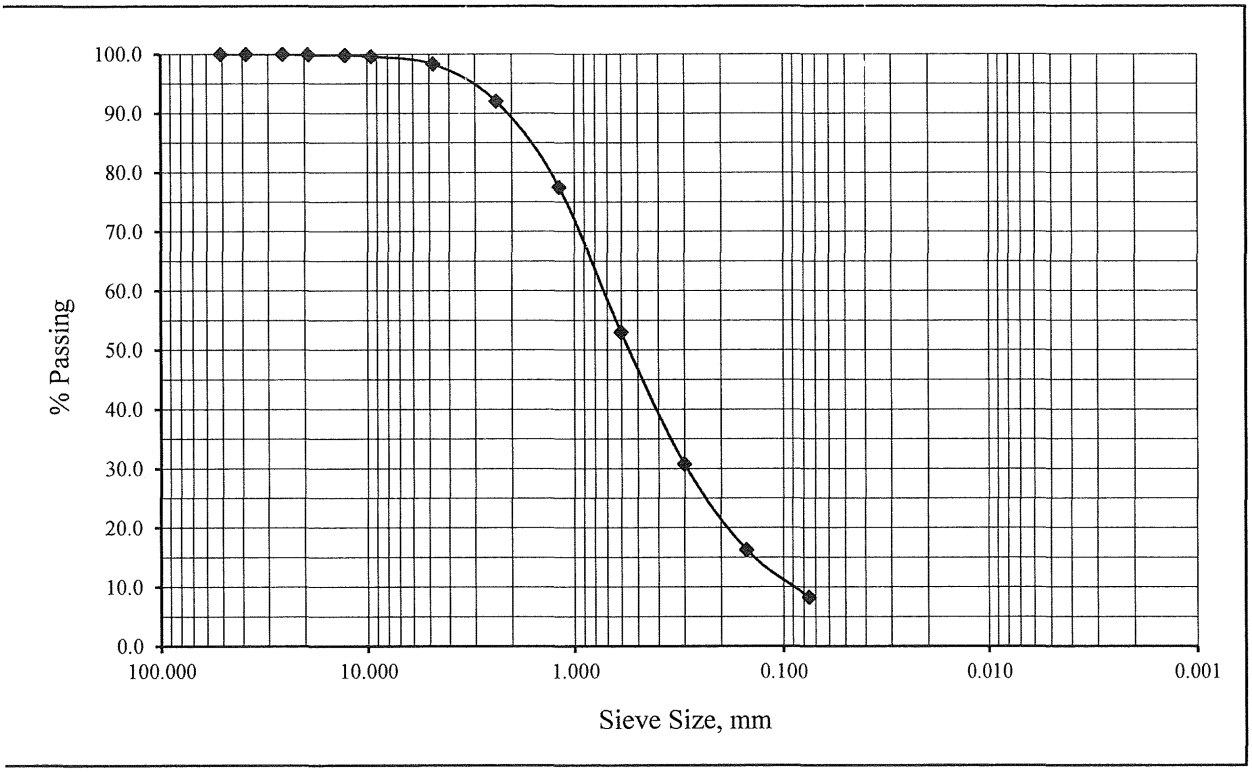
Sladden Engineering
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-22471 December 30, 2022
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-1 Bulk 1 @ 0-5' Soil Classification: SW-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	99.9
1/2"	12.7	99.8
3/8"	9.53	99.6
#4	4.75	98.4
#8	2.36	92.1
#16	1.18	77.5
#30	0.60	53.0
#50	0.30	30.8
#100	0.15	16.3
#200	0.075	8.3



Sladden Engineering

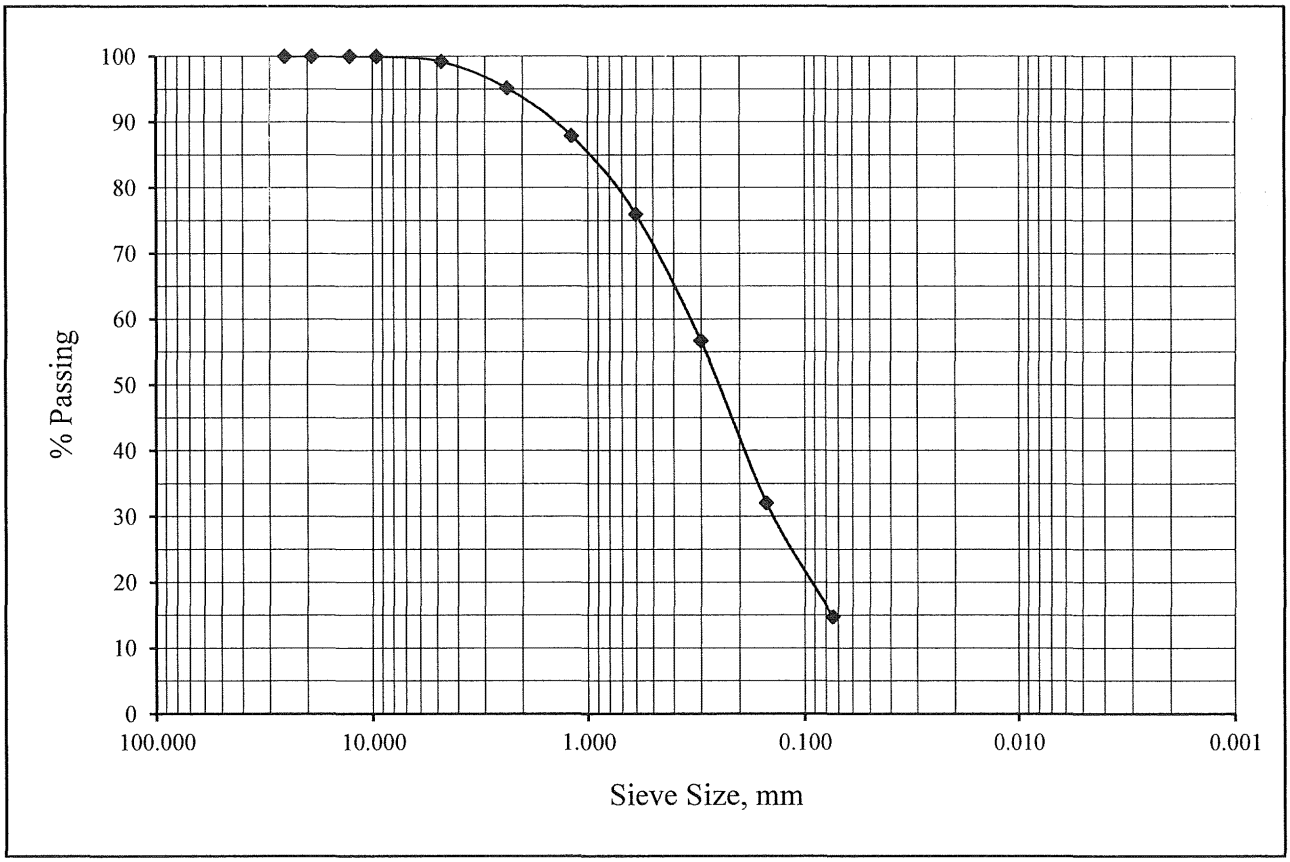
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-22471 December 30, 2022
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-1 R-2 @ 5' Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	99.2
#8	2.36	95.2
#16	1.18	87.9
#30	0.60	76.0
#50	0.30	56.7
#100	0.15	32.1
#200	0.074	14.8



Sladden Engineering

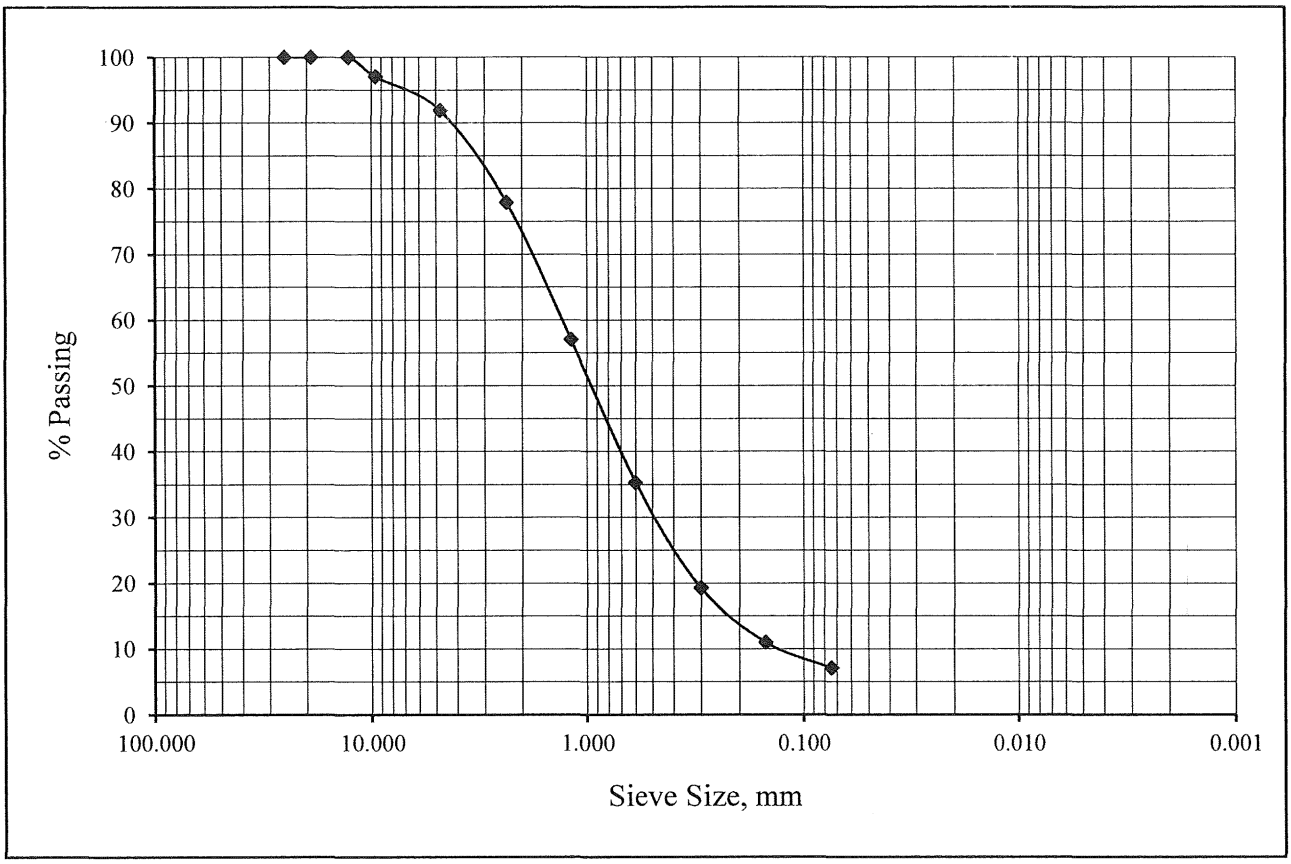
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-22471 December 30, 2022
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-3 S-2 @ 10' Soil Classification: SW-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	97.1
#4	4.75	91.9
#8	2.36	77.9
#16	1.18	57.0
#30	0.60	35.4
#50	0.30	19.3
#100	0.15	11.0
#200	0.074	7.1



Sladden Engineering

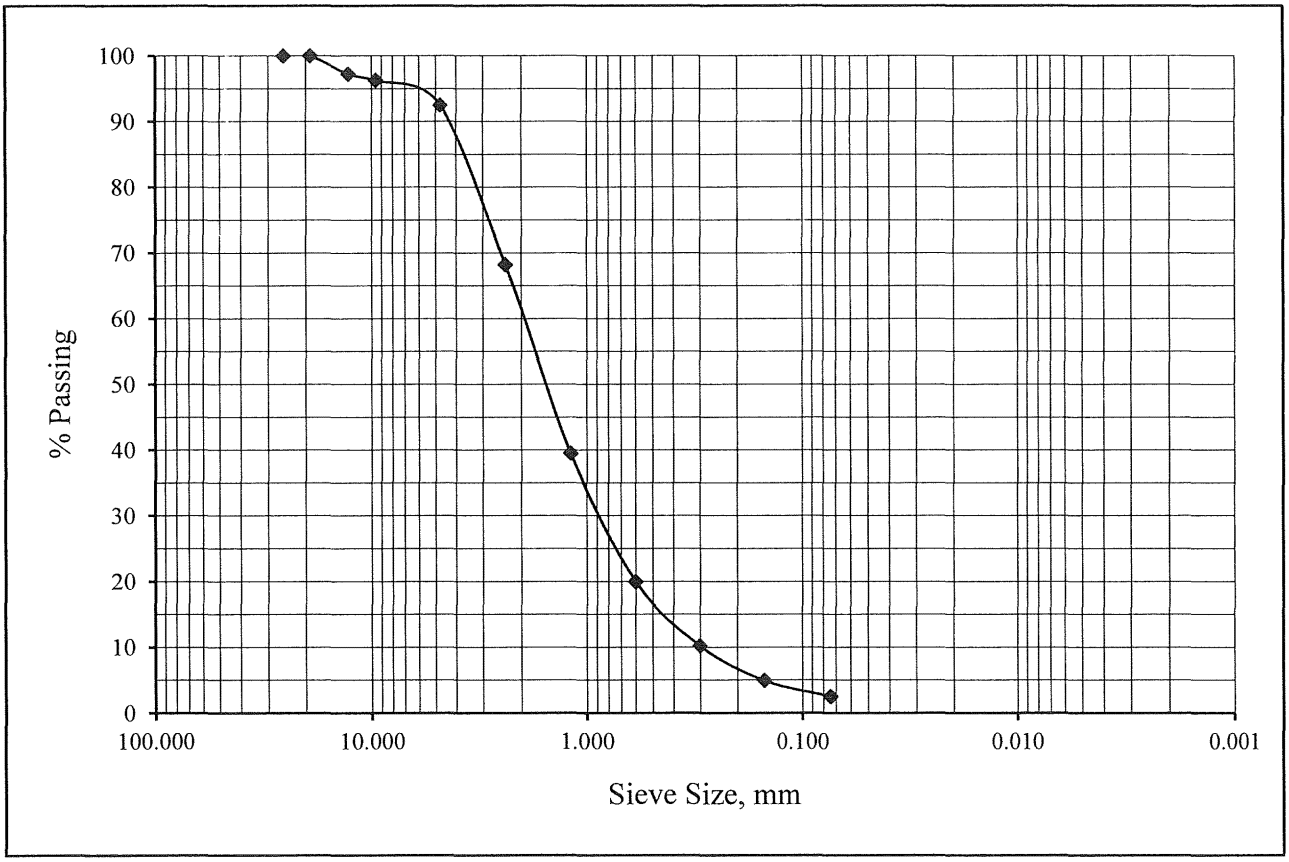
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-22471 December 30, 2022
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-5 R-3 @ 15' Soil Classification: SW

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	97.2
3/8"	9.53	96.3
#4	4.75	92.5
#8	2.36	68.2
#16	1.18	39.5
#30	0.60	20.0
#50	0.30	10.3
#100	0.15	5.0
#200	0.074	2.5



Sladden Engineering

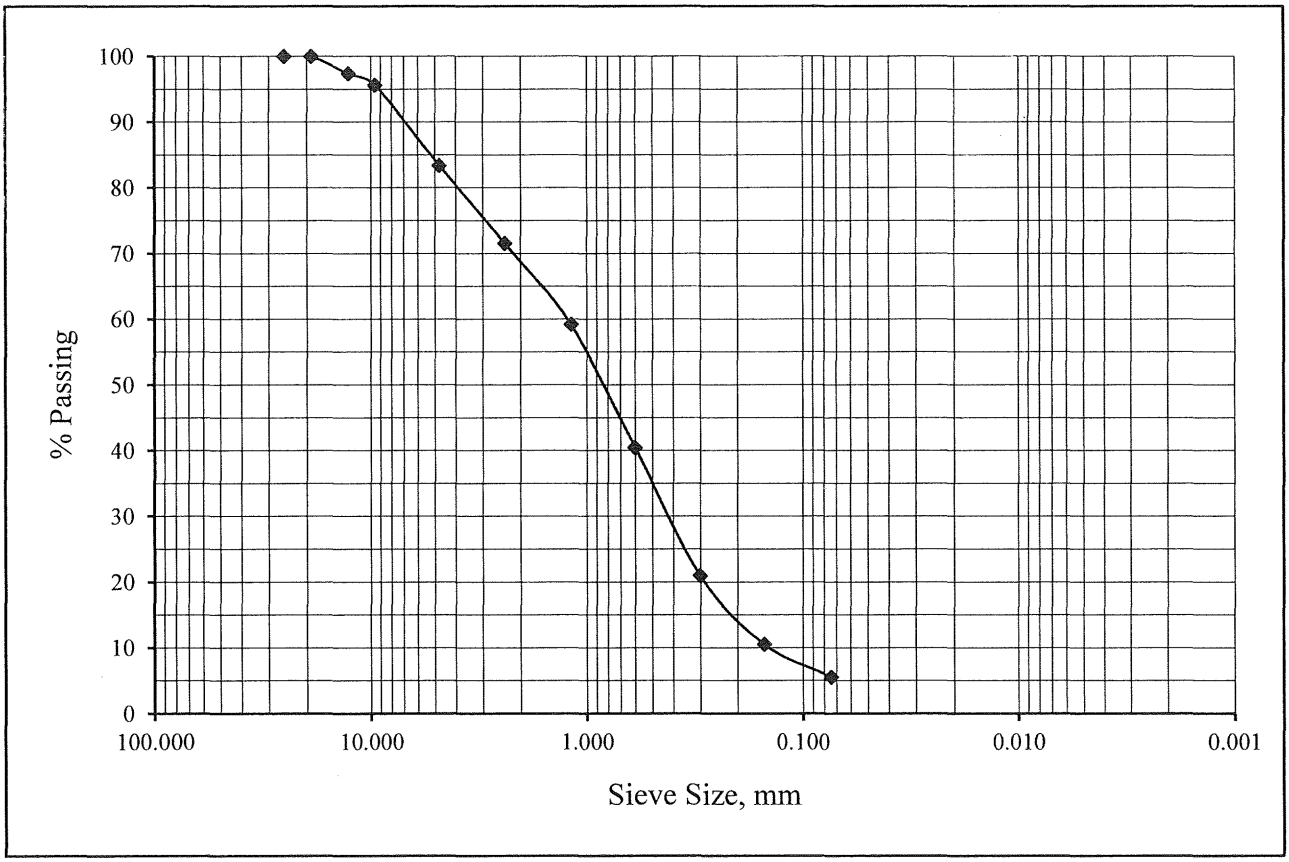
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-22471 December 30, 2022
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-7 S-3 @ 15' Soil Classification: SP-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	97.4
3/8"	9.53	95.6
#4	4.75	83.4
#8	2.36	71.5
#16	1.18	59.2
#30	0.60	40.4
#50	0.30	21.0
#100	0.15	10.5
#200	0.074	5.6



Sladden Engineering

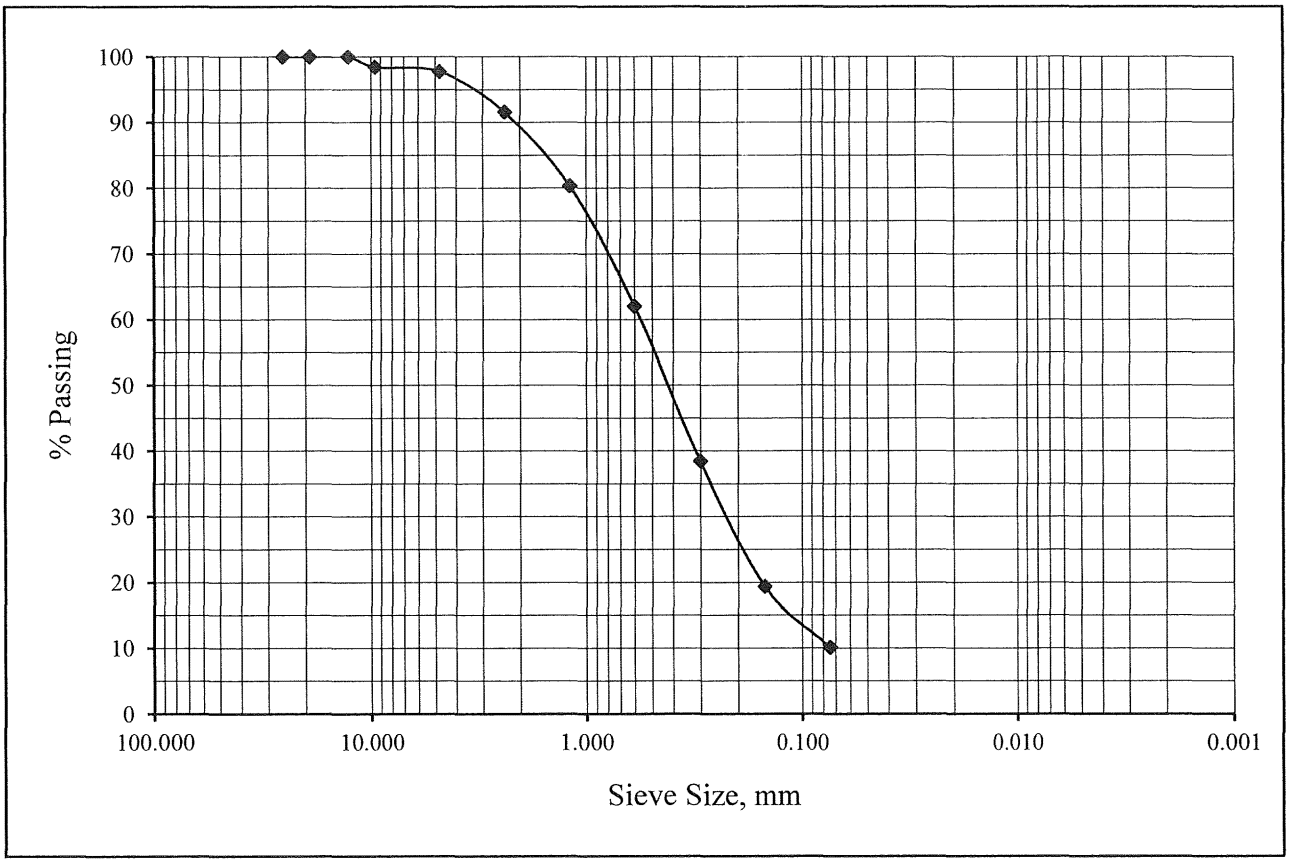
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-22471 December 30, 2022
Project Name: East Broadway
Lab ID Number: LN6-22566
Sample ID: BH-8 S-2 @ 10' Soil Classification: SW-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	98.4
#4	4.75	97.8
#8	2.36	91.6
#16	1.18	80.3
#30	0.60	62.0
#50	0.30	38.4
#100	0.15	19.4
#200	0.074	10.1



Sladden Engineering

450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

One Dimensional Consolidation

ASTM D2435 & D5333

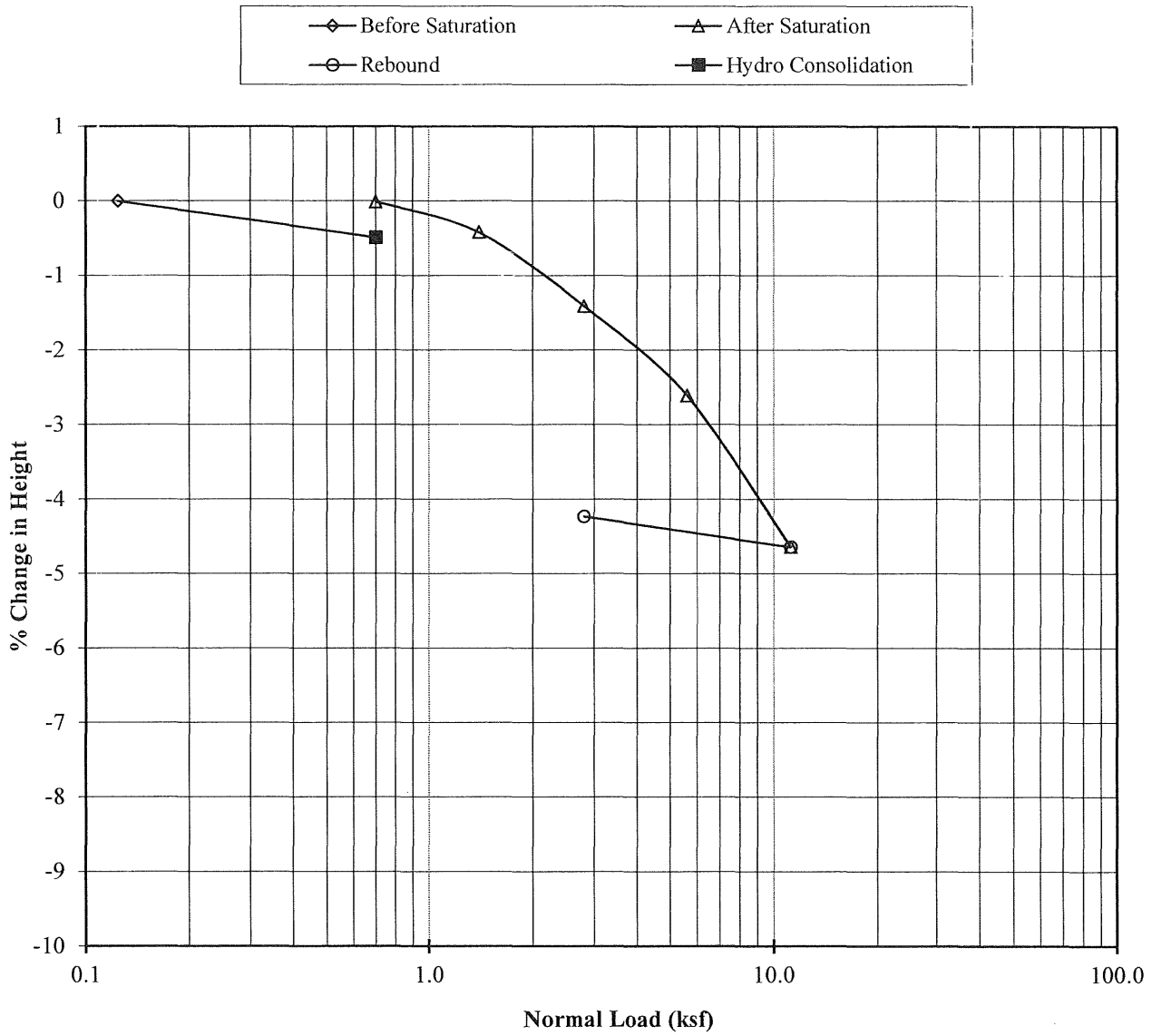
Job Number: 544-22471
Job Name: East Broadway

December 30, 2022

Lab ID Number: LN6-22566
Sample ID: BH-1 R-2 @ 5'
Soil Description: Brown Silty Sand (SM)

Initial Dry Density, pcf:	108.5
Initial Moisture, %:	1.2
Initial Void Ratio:	0.537
Specific Gravity:	2.67

% Change in Height vs Normal Presssure Diagram



Sladden Engineering

6782 Stanton Ave., Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
45090 Golf Center Pkwy, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Date: December 30, 2022

Account No.: 544-22471

Customer: Four Star Realty c/o Ms. Kim Chen

Location: APN 0605-051-01, East Broadway, Joshua Tree Area

Analytical Report

Corrosion Series

	pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
BH-1 @ 0-5'	8.7	80	30	7900

APPENDIX C

SEISMIC DESIGN MAP AND REPORT
SITE-SPECIFIC GROUND MOTION PARAMETERS

East Broadway Street, Joshua Tree; APN 0605-051-01

Latitude, Longitude: 34.1623, -116.2690

Date	1/4/2023, 10:55:29 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.96	MCE_R ground motion. (for 0.2 second period)
S_1	0.714	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.96	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.307	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.845	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.929	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.96	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.156	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.191	Factored deterministic acceleration value. (0.2 second)
S1RT	0.714	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.793	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.804	Factored deterministic acceleration value. (1.0 second)
PGAd	0.909	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.845	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration

Type	Value	Description
C_{RS}	0.909	Mapped value of the risk coefficient at short periods
C_{R1}	0.9	Mapped value of the risk coefficient at a period of 1 s
C_V	1.492	Vertical coefficient

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

SITE-SPECIFIC GROUND MOTION ANALYSIS
(ASCE 7-16)

Project: East Broadway Street, Joshua Tree; APN 0605-051-01
Project Number: 544-22471
Client: Four Star Realty, c/o Kim Chen
Site Lat/Long: 34.1623/-116.2690
Controlling Seismic Source: Pinto Mountain

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.182
S_{D1}/S_{DS}	T_S	0.911
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	1.1900
Equation 11.4-2 - F_V*S_1 [1]	S_{M1}	1.7850

[1] - F_V as determined by Section 21.3

REFERENCE	NOTATION	VALUE
Fv (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_s	1.960
Design Maps	S_1	0.714
Equation 11.4-1 - F_A*S_S	S_{MS}	1.960*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	1.307*
Design Maps	PGA	0.845
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - $F_{PGA}*PGA$	PGA_M	0.93*
Section 21.5.3	80% of PGA_M	0.744
Design Maps	C_{RS}	0.909
Design Maps	C_{R1}	0.9

REFERENCE	NOTATION	VALUE
$0.2*(S_{D1}/S_{DS})$	T_0	0.124*
S_{D1}/S_{DS}	T_S	0.619*
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	0.8092*
Equation 11.4-2 - F_V*S_1	S_{M1}	1.2138*

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=C_{RS}	C_{RS}	0.909
Cr - At Periods >=1.0, Cr=C_{R1}	C_{R1}	0.9

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete

Period	Cr
0.200	0.909
0.300	0.908
0.400	0.907
0.500	0.906
0.600	0.905
0.680	0.904
1.000	0.9

* **Code based design value.** See accompanying data for Site Specific Design values.

Mapped values from https://hazards.atcouncil.org/
https://www.seismicmaps.org/

Sladden Engineering

PROBABILISTIC SPECTRA[1]
2% in 50 year Exceedence

Project No: 544-22471

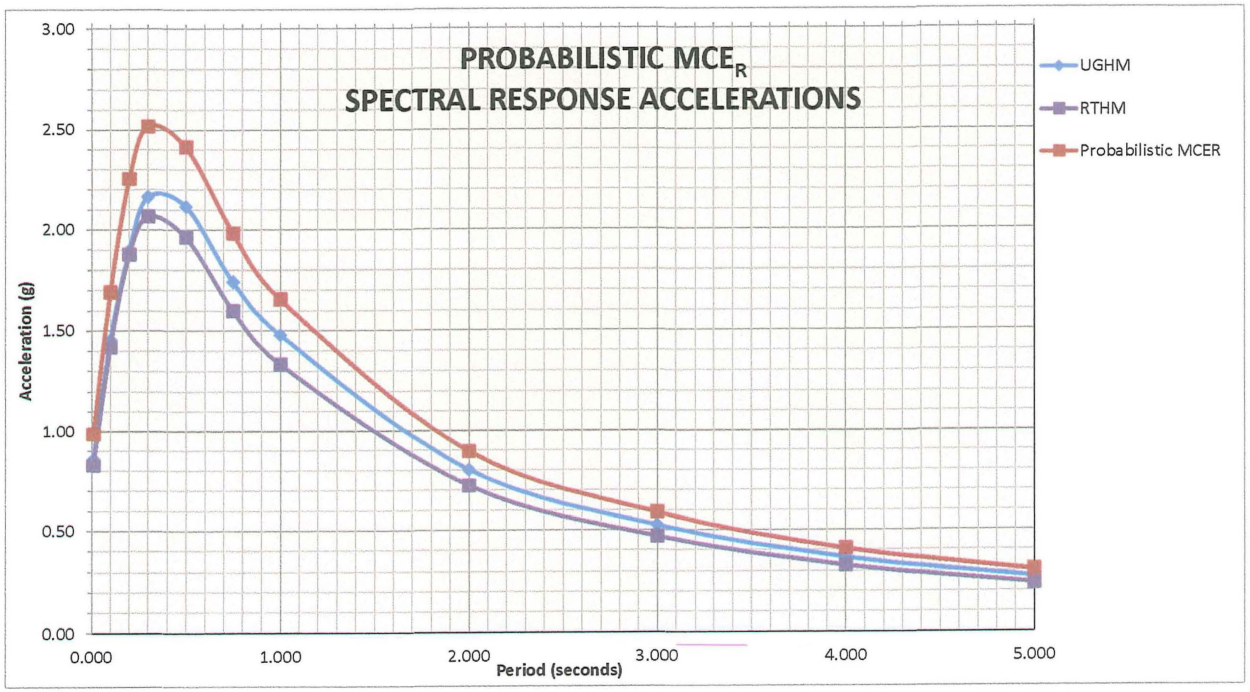
Period	UGHM	RTGM	Max Directional Scale Factor[2]	Probabilistic MCE
0.010	0.858	0.828	1.19	0.985
0.100	1.454	1.419	1.19	1.689
0.200	1.897	1.876	1.20	2.251
0.300	2.162	2.064	1.22	2.518
0.500	2.114	1.961	1.23	2.412
0.750	1.740	1.598	1.24	1.982
1.000	1.479	1.334	1.24	1.654
2.000	0.802	0.721	1.24	0.894
3.000	0.524	0.469	1.25	0.586
4.000	0.364	0.325	1.25	0.406
5.000	0.271	0.240	1.26	0.302

Probabilistic PGA: 0.858

Is Probabilistic $Sa_{(max)} < 1.2F_a$? NO

[1] Data Sources:
https://earthquake.usgs.gov/hazards/interactive/
https://earthquake.usgs.gov/designmaps/rtgm/

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations[1]

Controlling Source: Pinto Mountain

Is Probabilistic $Sa_{(max)}$<1.2Fa? NO

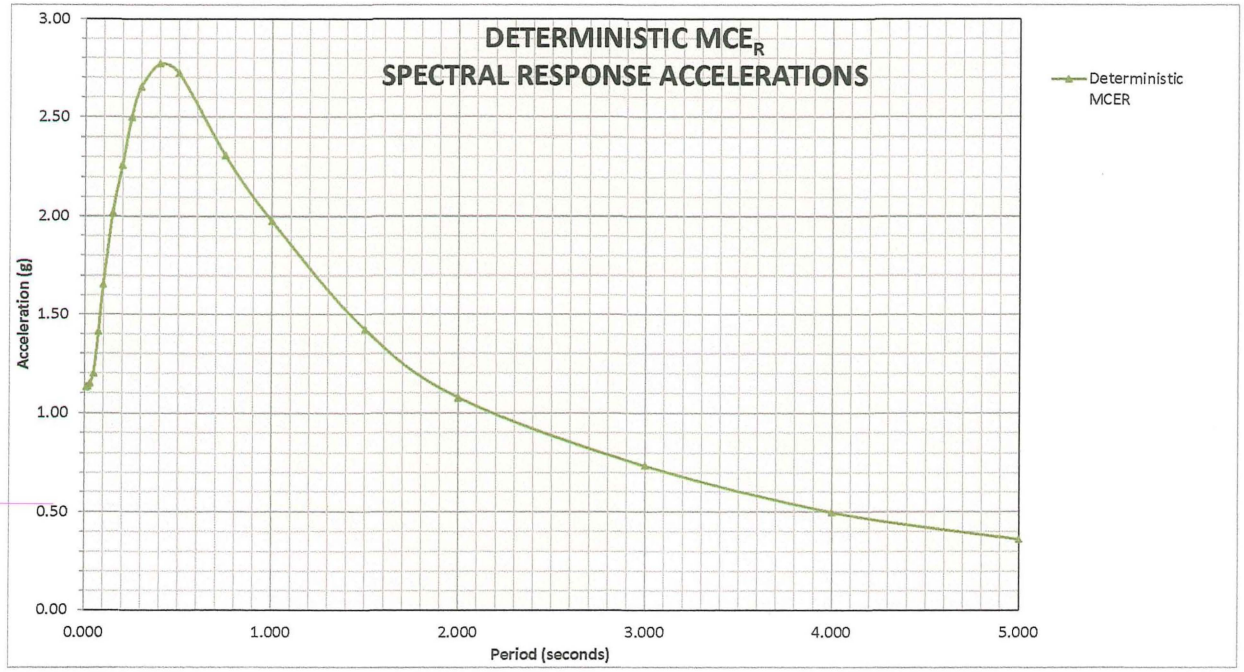
Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor[2]	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.949	1.19	1.129	1.129
0.020	0.953	1.19	1.134	1.134
0.030	0.964	1.19	1.148	1.148
0.050	1.007	1.19	1.199	1.199
0.075	1.186	1.19	1.411	1.411
0.100	1.391	1.19	1.655	1.655
0.150	1.680	1.20	2.016	2.016
0.200	1.883	1.20	2.260	2.260
0.250	2.066	1.21	2.499	2.499
0.300	2.174	1.22	2.652	2.652
0.400	2.252	1.23	2.770	2.770
0.500	2.213	1.23	2.722	2.722
0.750	1.860	1.24	2.306	2.306
1.000	1.592	1.24	1.974	1.974
1.500	1.146	1.24	1.421	1.421
2.000	0.867	1.24	1.075	1.075
3.000	0.587	1.25	0.734	0.734
4.000	0.396	1.25	0.495	0.495
5.000	0.286	1.26	0.360	0.360

Project No: 544-22471

Is Determinstic $Sa_{(max)}$<1.5*Fa?	NO
Section 21.2.2 Scaling Factor:	N/A
Deterministic PGA:	0.949
Is Deterministic PGA >=F_{PGA}*0.5?	YES

[1] NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	0.985	1.129	0.985	0.657
0.100	1.689	1.655	1.655	1.104
0.200	2.251	2.260	2.251	1.501
0.300	2.518	2.652	2.518	1.679
0.500	2.412	2.722	2.412	1.608
0.750	1.982	2.306	1.982	1.321
1.000	1.654	1.974	1.654	1.103
2.000	0.894	1.075	0.894	0.596
3.000	0.586	0.734	0.586	0.391
4.000	0.406	0.495	0.406	0.271
5.000	0.302	0.360	0.302	0.202

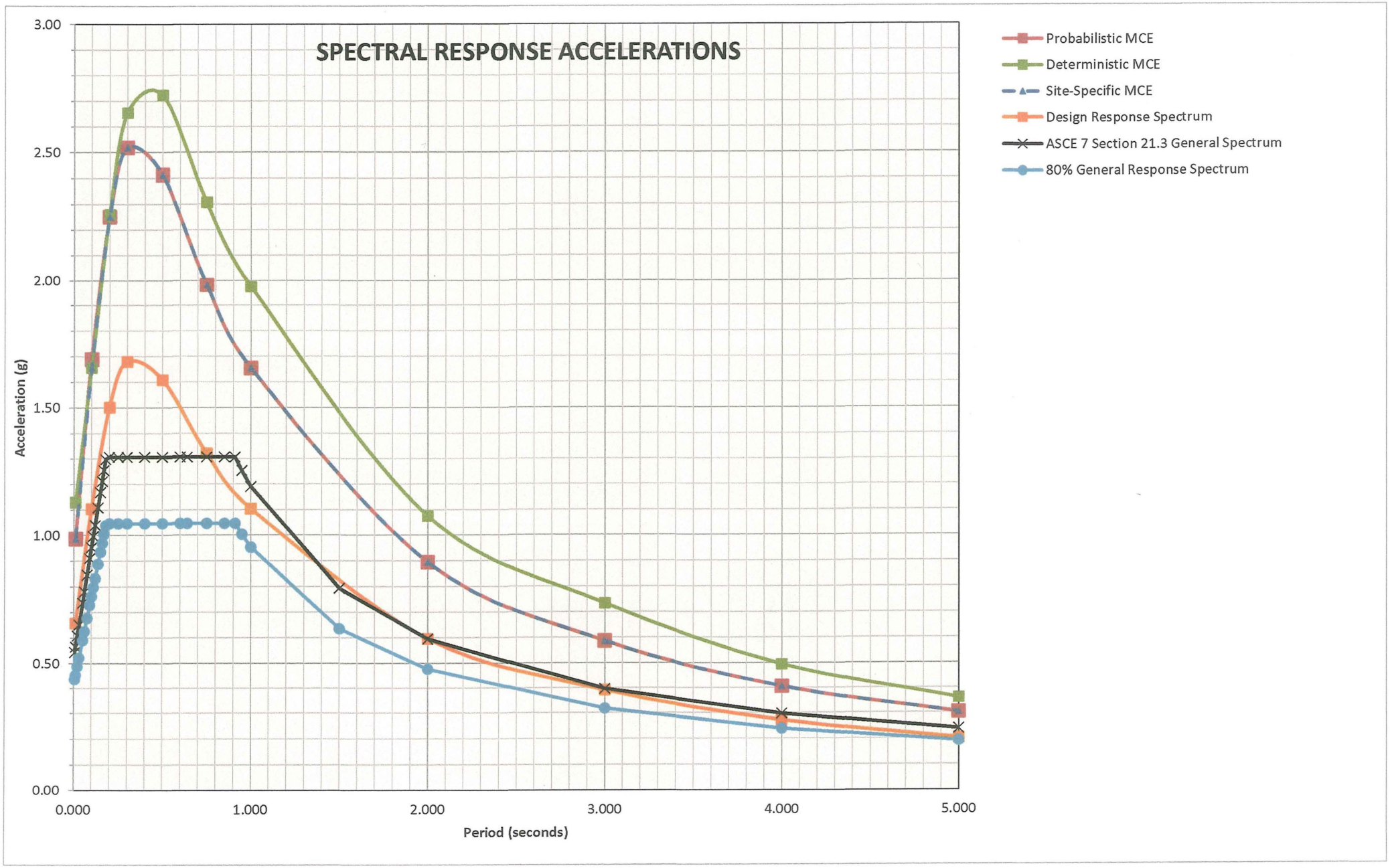
ASCE 7-16: Section 21.4
Site Specific

	Calculated Value	Design Value
SDS:	1.511	1.511
SD1:	1.192	1.192
SMS:	2.266	2.266
SM1:	1.788	1.788
Site Specific PGAm:	0.858	0.858
Site Class:	D measured	

Seismic Design Category - Short* D
Seismic Design Category - 1s* D
* Risk Categories I, II, or III

Period	ASCE 7 SECTION 21.3 General Spectrum	80% General Response Spectrum
0.005	0.544	0.435
0.010	0.566	0.453
0.020	0.609	0.487
0.030	0.652	0.521
0.050	0.738	0.590
0.060	0.781	0.625
0.075	0.845	0.676
0.090	0.910	0.728
0.100	0.953	0.762
0.110	0.996	0.797
0.120	1.039	0.831
0.136	1.108	0.886
0.150	1.168	0.935
0.160	1.211	0.969
0.170	1.254	1.004
0.180	1.297	1.038
0.200	1.307	1.045
0.250	1.307	1.045
0.300	1.307	1.045
0.400	1.307	1.045
0.500	1.307	1.045
0.600	1.307	1.045
0.640	1.307	1.045
0.750	1.307	1.045
0.850	1.307	1.045
0.910	1.307	1.045
0.950	1.253	1.002
1.000	1.190	0.952
1.500	0.793	0.635
2.000	0.595	0.476
3.000	0.397	0.317
4.000	0.298	0.238
5.000	0.238	0.190

Project No: 544-22471


SPECTRAL RESPONSE ACCELERATIONS
Acceleration (g)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.000
1.000
2.000
3.000
4.000
5.000
Period (seconds)
Probabilistic MCE
Deterministic MCE
Site-Specific MCE
Design Response Spectrum
ASCE 7 Section 21.3 General Spectrum
80% General Response Spectrum

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863
www.Sladdenengineering.com

May 6, 2025

Project No. 544-22471
25-05-232

JT Santorini Villa LLC
c/o Kim Chen
1751 Colorado Boulevard, #333
Los Angeles, California 90041

Project: Proposed Joshua Tree Estates
APN 0605-051-01
SEC East Broadway Street & Laferney Avenue
Tentative Tract Map No. 20668
Joshua Tree Area
San Bernardino County, California

Subject: Geotechnical & Sewage Disposal Feasibility Report

Ref: Geotechnical Investigation report prepared by Sladden Engineering dated January 5, 2023; Project No. 544-22471, Report No. 23-01-005
Percolation Testing for Onsite Sewage Disposal Feasibility prepared by Sladden Engineering dated January 10, 2023; Project No. 544-22471, Report No. 23-01-015

In accordance with your request, we have reviewed the above referenced reports as they relate to the design and construction of the proposed Joshua Tree Estates. The project site (identified as APN 0605-051-01) is located on the southeast corner of East Broadway Street & Laferney Avenue in the Joshua Tree area of San Bernardino County, California. It is our understanding that the proposed residential structures will be of relatively lightweight wood-frame construction and will be supported by conventional shallow spread footings and concrete slabs on grade.

The referenced reports include recommendations pertaining to the design and construction of residential structure foundations. Based upon our review of the referenced reports, our previous experience on the project site and our understanding of the proposed construction, it is our opinion that the structural values and remedial grading recommendations included in the Geotechnical Investigation report remain applicable for use in the design and construction of the proposed residential structures, except as amended herein.

The proposed residential structures maybe supported upon conventional shallow spread footings. All footings should be founded upon properly compacted engineered fill soil and should have a minimum embedment depth of 12 inches measured from the lowest adjacent finished grade. Continuous footings and isolated pad footings should have minimum widths of 12 inches and 24 inches, respectively. Continuous footings and isolated pad footings supported upon properly compacted engineered fill soil may be designed using allowable (net) bearing pressures of 1800 and 2000 pounds per square foot (psf), respectively. Allowable increases of 200 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth may be used, if desired. The maximum allowable bearing pressure should be 2500 psf. The allowable bearing pressures are intended for combined dead and sustained live loads. The allowable bearing pressures may be increased by one-third when considering transient live loads, including seismic and wind forces.

Static settlement resulting from the anticipated foundation loads should be tolerable provided that the recommendations included in this report are considered in foundation design and construction. The ultimate static settlement is expected to be less than 1.0 inch when using the recommended allowable foundation bearing pressures. As a practical matter, differential static settlement between footings can be assumed as one-half of the total static settlement.

Lateral forces may be resisted by friction along the base of the foundations and passive resistance along the sides of the footings. A friction coefficient of 0.45 times the normal dead load forces is recommended for use in design. Passive resistance may be estimated using an equivalent fluid weight of 250 pcf. If used in combination with the passive resistance, the frictional resistance should be reduced by one third.

The surface soil is non-expansive and falls within the "very low" expansion category in accordance with 2022 California Building Code (CBC) classification criteria. Slab thickness and reinforcement should be determined by the structural engineer. We recommend a minimum floor slab thickness of 4.0 inches and minimum reinforcement of #3 bars at 24 inches on center in both directions. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height.

Slabs with moisture sensitive surfaces should be underlain with a moisture vapor retarder consisting of a polyvinyl chloride membrane such as 10-mil Visqueen, or equivalent. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface cannot be achieved by grading, consideration should be given to placing a thin leveling course of sand across the pad surface prior to placement of the membrane.

Minor retaining walls may be necessary to accomplish the proposed construction. Lateral pressures for use in retaining wall design can be estimated using an equivalent fluid weight of 35 pcf for level drained native backfill conditions. For walls that are to be restrained at the top, the equivalent fluid weight should be increased to 55 pcf for level drained native backfill conditions. Back drains should be provided for the full height of the walls. Seismic pressures should be incorporated into any retaining walls greater than 6 feet in height. Seismic deign pressures may be provided once specific wall heights and locations are known.

The seismic design category for a structure may be determined in accordance with Section 1613 of the 2022 CBC or ASCE7-16. According to the 2022 CBC, Site Class D measured may be used to estimate design seismic loading for the proposed structures. The 2022 CBC seismic design parameters are attached. The project Structural Engineer should verify that the design parameters provided are applicable for the subject project.

To provide firm and uniform foundation bearing conditions, the primary foundation bearing soil should be over-excavated and recompacted. Over-excavation should extend to a minimum depth of 3 feet below existing grade or 2 feet below the bottom of the footings, whichever is deeper. Once adequate removals have been verified, the exposed native soil should be moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction. The previously removed material may then be placed in thin lifts at near optimum moisture content and compacted to at least 90 percent relative compaction. Removals should extend at least 5 feet laterally beyond the footing limits.

In addition, we have reviewed the referenced Percolation Testing for On-site Sewage Disposal Feasibility report as it relates to septic system design. Based upon our review of the referenced report and the current project plans, it is our opinion that the leach line design criteria remain applicable.

Standard Design (3 Ft of Gravel Below Leach Lines)

Number of Bedrooms	1-2	3	4	5-6
Application Rate (ft2/gal/day)	0.83	0.83	0.83	0.83
Gallons of Effluent Per Day	500	670	800	1,000
Gallons of Septic Tank Capacity	750	1,000	1,200	1,500
Absorption Area (ft2):	415	556	664	830
Trench Credit (ft2 per ft):	7	7	7	7
Total Leach Line Length (ft	60	80	95	119
Number of Leach Lines	2 @ 30 Ft.	2 @ 40 Ft.	2 @ 48 Ft.	3 @ 40 Ft.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this letter or the referenced report, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Brett L. Anderson
Principal Engineer

SER/cg

REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

Matthew J. Cohrt
Principal Geologist

PROFESSIONAL GEOLOGIST
Matthew J. Cohrt
No. 2634
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Copies: pdf/ Addressee

SITE-SPECIFIC GROUND MOTION ANALYSIS
(ASCE 7-16)

Project: East Broadway Street, Joshua Tree; APN 0605-051-01
Project Number: 544-22471
Client: Four Star Realty, c/o Kim Chen
Site Lat/Long: 34.1623/-116.2690
Controlling Seismic Source: Pinto Mountain

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.182
S_{D1}/S_{DS}	T_S	0.911
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	1.1900
Equation 11.4-2 - F_V*S_1 [1]	S_{M1}	1.7850

[1] - F_V as determined by Section 21.3

REFERENCE	NOTATION	VALUE
Fv (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_s	1.960
Design Maps	S_1	0.714
Equation 11.4-1 - F_A*S_S	S_{MS}	1.960*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	1.307*
Design Maps	PGA	0.845
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - $F_{PGA}*PGA$	PGA_M	0.93*
Section 21.5.3	80% of PGA_M	0.744
Design Maps	C_{RS}	0.909
Design Maps	C_{R1}	0.9

REFERENCE	NOTATION	VALUE
$0.2*(S_{D1}/S_{DS})$	T_0	0.124*
S_{D1}/S_{DS}	T_S	0.619*
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	0.8092*
Equation 11.4-2 - F_V*S_1	S_{M1}	1.2138*

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=C_{RS}	C_{RS}	0.909
Cr - At Periods >=1.0, Cr=C_{R1}	C_{R1}	0.9

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete

Period	Cr
0.200	0.909
0.300	0.908
0.400	0.907
0.500	0.906
0.600	0.905
0.680	0.904
1.000	0.9

* **Code based design value.** See accompanying data for Site Specific Design values.

Mapped values from https://hazards.atcouncil.org/
https://www.seismicmaps.org/

Sladden Engineering

PROBABILISTIC SPECTRA[1]
2% in 50 year Exceedence

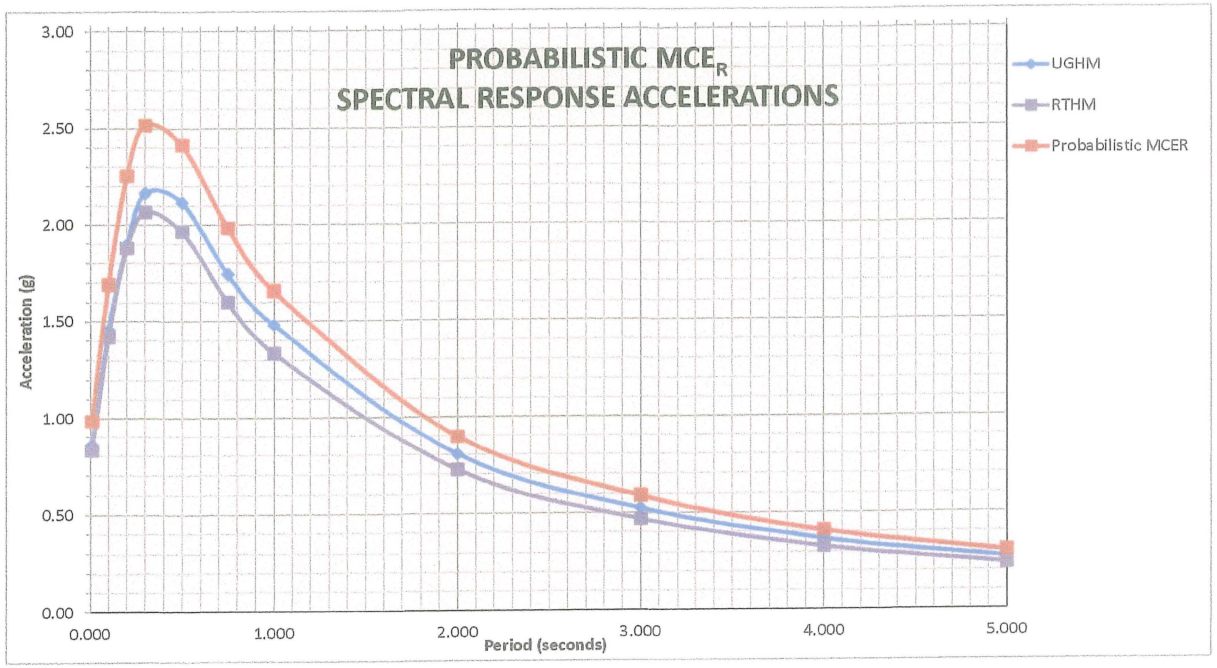
Project No: 544-22471

Period	UGHM	RTGM	Max Directional Scale Factor[2]	Probabilistic MCE
0.010	0.858	0.828	1.19	0.985
0.100	1.454	1.419	1.19	1.689
0.200	1.897	1.876	1.20	2.251
0.300	2.162	2.064	1.22	2.518
0.500	2.114	1.961	1.23	2.412
0.750	1.740	1.598	1.24	1.982
1.000	1.479	1.334	1.24	1.654
2.000	0.802	0.721	1.24	0.894
3.000	0.524	0.469	1.25	0.586
4.000	0.364	0.325	1.25	0.406
5.000	0.271	0.240	1.26	0.302

[1] Data Sources:
https://earthquake.usgs.gov/hazards/interactive/
https://earthquake.usgs.gov/designmaps/rtgm/

[2] Shahi-Baker RotD100/RotD50 Factors (2014)

Probabilistic PGA: 0.858
Is Probabilistic $Sa_{(max)}$<1.2F_a? NO



Sladden Engineering

DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations[1]

Controlling Source: Pinto Mountain

Is Probabilistic $Sa_{(max)}$<1.2Fa? NO

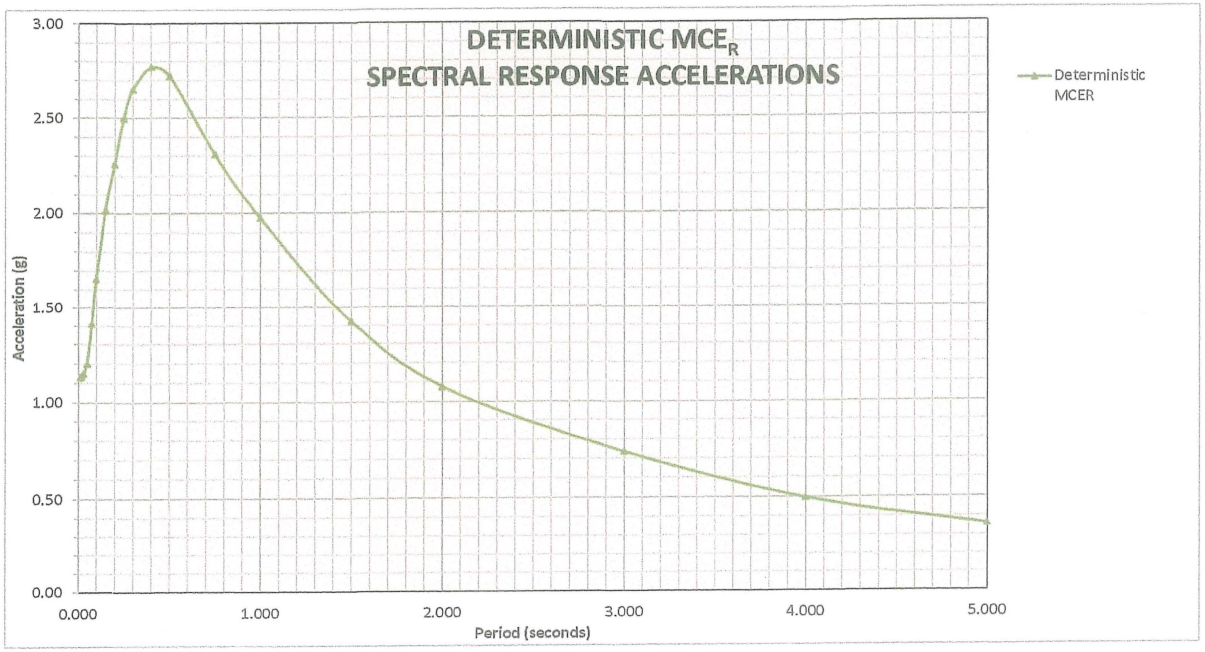
Project No: 544-22471

Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor[2]	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	0.949	1.19	1.129	1.129
0.020	0.953	1.19	1.134	1.134
0.030	0.964	1.19	1.148	1.148
0.050	1.007	1.19	1.199	1.199
0.075	1.186	1.19	1.411	1.411
0.100	1.391	1.19	1.655	1.655
0.150	1.680	1.20	2.016	2.016
0.200	1.883	1.20	2.260	2.260
0.250	2.066	1.21	2.499	2.499
0.300	2.174	1.22	2.652	2.652
0.400	2.252	1.23	2.770	2.770
0.500	2.213	1.23	2.722	2.722
0.750	1.860	1.24	2.306	2.306
1.000	1.592	1.24	1.974	1.974
1.500	1.146	1.24	1.421	1.421
2.000	0.867	1.24	1.075	1.075
3.000	0.587	1.25	0.734	0.734
4.000	0.396	1.25	0.495	0.495
5.000	0.286	1.26	0.360	0.360

Is Determinstic $Sa_{(max)}$<1.5*Fa?	NO
Section 21.2.2 Scaling Factor:	N/A
Deterministic PGA:	0.949
Is Deterministic PGA >=F_{PGA}*0.5?	YES

[1] NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	0.985	1.129	0.985	0.657
0.100	1.689	1.655	1.655	1.104
0.200	2.251	2.260	2.251	1.501
0.300	2.518	2.652	2.518	1.679
0.500	2.412	2.722	2.412	1.608
0.750	1.982	2.306	1.982	1.321
1.000	1.654	1.974	1.654	1.103
2.000	0.894	1.075	0.894	0.596
3.000	0.586	0.734	0.586	0.391
4.000	0.406	0.495	0.406	0.271
5.000	0.302	0.360	0.302	0.202

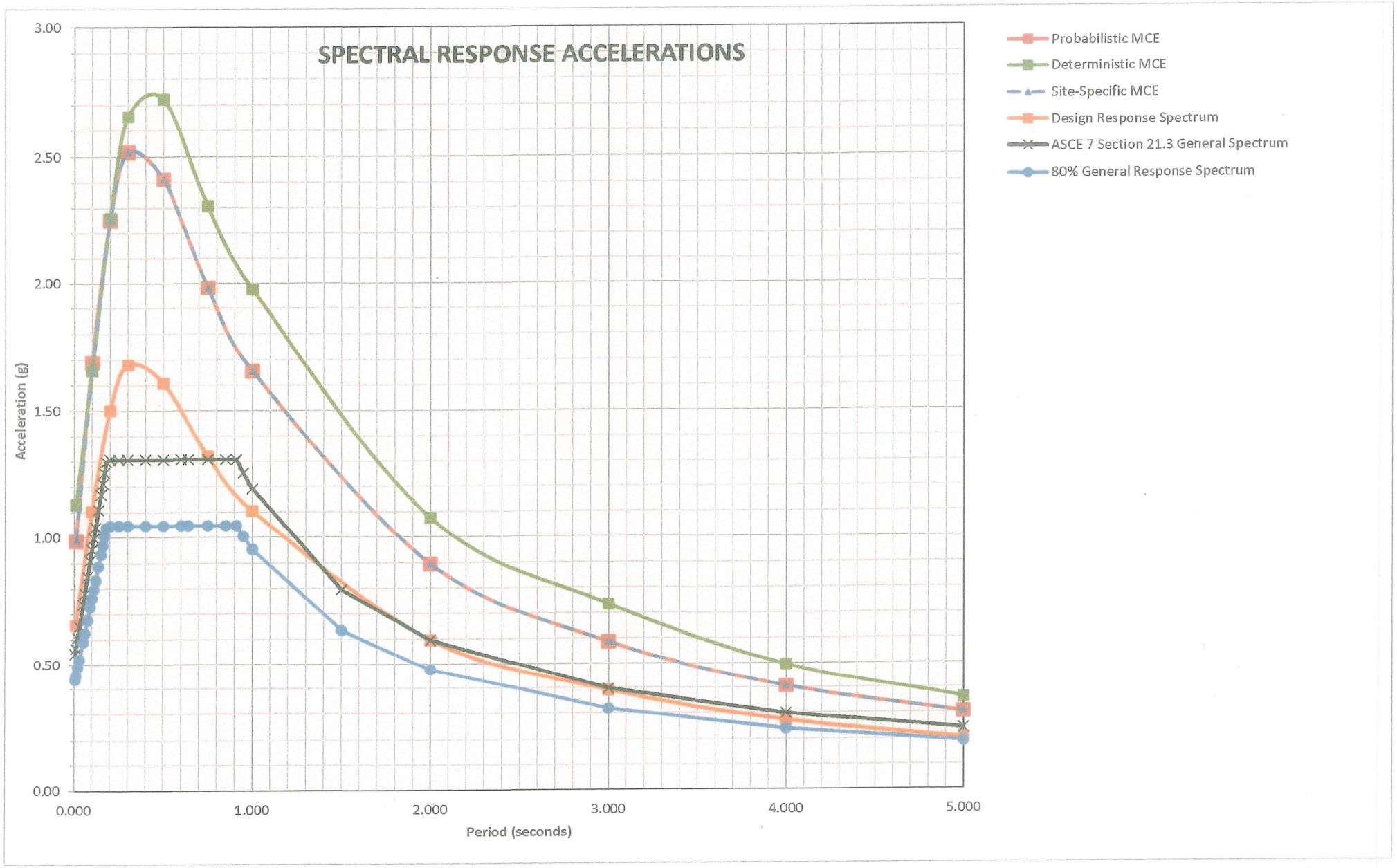
	ASCE 7-16: Section 21.4 Site Specific	
	Calculated Value	Design Value
SDS:	1.511	1.511
SD1:	1.192	1.192
SMS:	2.266	2.266
SM1:	1.788	1.788
Site Specific PGAm:	0.858	0.858
Site Class:	D measured	

Seismic Design Category - Short*	D
Seismic Design Category - 1s*	D

* Risk Categories I, II, or III

Period	ASCE 7 SECTION 21.3 General Spectrum	80% General Response Spectrum
0.005	0.544	0.435
0.010	0.566	0.453
0.020	0.609	0.487
0.030	0.652	0.521
0.050	0.738	0.590
0.060	0.781	0.625
0.075	0.845	0.676
0.090	0.910	0.728
0.100	0.953	0.762
0.110	0.996	0.797
0.120	1.039	0.831
0.136	1.108	0.886
0.150	1.168	0.935
0.160	1.211	0.969
0.170	1.254	1.004
0.180	1.297	1.038
0.200	1.307	1.045
0.250	1.307	1.045
0.300	1.307	1.045
0.400	1.307	1.045
0.500	1.307	1.045
0.600	1.307	1.045
0.640	1.307	1.045
0.750	1.307	1.045
0.850	1.307	1.045
0.910	1.307	1.045
0.950	1.253	1.002
1.000	1.190	0.952
1.500	0.793	0.635
2.000	0.595	0.476
3.000	0.397	0.317
4.000	0.298	0.238
5.000	0.238	0.190

Project No: 544-22471


SPECTRAL RESPONSE ACCELERATIONS
Acceleration (g)
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.000
1.000
2.000
3.000
4.000
5.000
Period (seconds)
Probabilistic MCE
Deterministic MCE
Site-Specific MCE
Design Response Spectrum
ASCE 7 Section 21.3 General Spectrum
80% General Response Spectrum

JOSHUA TREE ESTATES

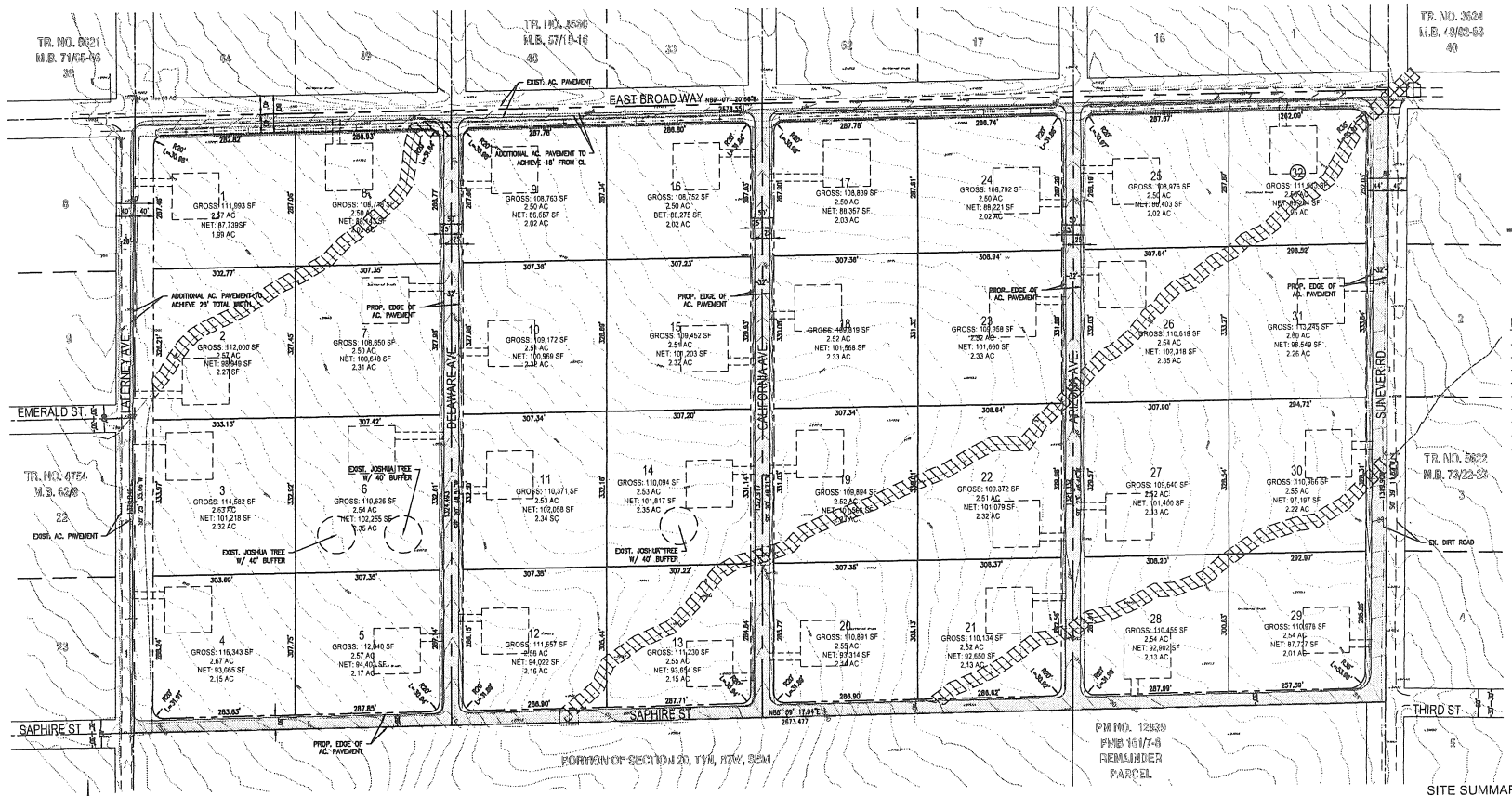
IN UNINCORPORATED TERRITORY OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

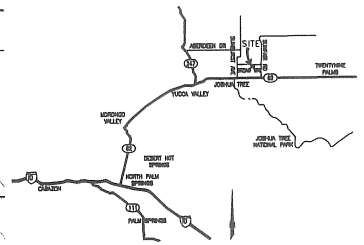
TENTATIVE TRAC.T No. 20668

BEING A PROPOSED SUBDIVISION OF THE NORTH ONE-HALF OF THE NORTHEAST ONE- QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA AC,CORDING TO THE OFFICIAL PLAT THEREOF.

JULY 2024

FOR OFFICIAL USE ONLY





VICINITY MAP

NOT TO SCALE

LEGEND

- PROJECT BOUNDARY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- STREET CENTERLINE
- 1640 EXISTING MAJOR CONTOUR
- 1640 EXISTING MINOR CONTOUR
- PROPOSED CONTOUR
- EXIST. FLOW LINE & DIRECTION
- PROPOSED SWALE
- 2:1 PROPOSED SLOPE W/SLOPE RATIO
- FLOW DIRECTION
- PROPOSED CHANNEL CROSSING
- 10,000 S.F. BLDG. ENVELOPE

MIN. 20' WIDE DRAINAGE EASEMENT. FINAL WIDTH TO BE DETERMINED AT TIME OF FINAL MAP & CONSTRUCTION DRAWINGS

ABBREVIATIONS

FS	FINISH SURFACE ELEVATION
PE	PAD ELEVATION
H.P.	HIGH POINT
L.P.	LOW POINT
H=2.5'	HEIGHT OF WALL OR D.F.
T/C	TOP OF CRATE INLET
T/S	TOP OF SLOPE
G.B.	GRADE BREAK
FL	FLOWLINE
TR	TRACT MAP
NO.	NUMBER
MB	MAP BOOK
PMB	PARCEL MAP BOOK
PM	PARCEL MAP
ST	STREET
BNDY	BOUNDARY
CL	CENTERLINE
HZ	HORIZONTAL
EX.	EXISTING
N'LY	NORTHERLY
S'LY	SOUTHERLY
E'LY	EASTERLY
W'LY	WESTERLY
AC.	ASPHALT CONCRETE
PROP.	PROPOSED

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBER: 0605-051-01

UTILITY PROVIDERS

ELECTRIC:
SOUTHERN CALIFORNIA EDISON COMPANY
P.O. BOX 11482
SANTA ANA, CA 92711
(714) 796-9920

WATER:
JOSHUA BASIN WATER DIST.
61750 CHOLLA RD.
JOSHUA TREE, CA 92252
(760) 330-8438

SEWER:
PRIVATE INDIVIDUAL SEPTIC

TELEPHONE:
AT&T
(800) 310-2355

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9181

TRASH SERVICE:
4878 NEWTON ROAD
YUCCA VALLEY, CA 92284
(760) 340-2113

GAS:
SOUTHERN CALIFORNIA GAS COMPANY
(800) 427-2200
DEVELOPER WILL USE PROPANE

SITE SUMMARY

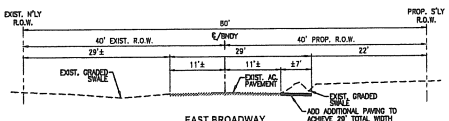
SITE ACREAGE (GROSS):	81.2 AC.
R.O.W. TO BE DEDICATED:	-11.6 AC.
SITE ACREAGE (NET):	70.2 AC.
TOTAL NUMBER OF RESIDENTIAL LOTS:	32
LINEAR FEET OF NEW STREETS	6,642 LF

SITE INFORMATION

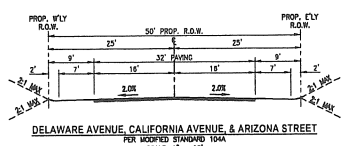
ASSESSOR'S PARCEL NUMBER: 0605-051-01
TRACT NUMBER: 20668
EXISTING ZONING: JT/RL (JOSHUA TREE/RURAL LIVING)
PROPOSED ZONING: NO CHANGE
EXISTING LAND USE: VACANT
PROPOSED LAND USE: SFR
PROJECT TYPE: DEVELOPER BUILD OUT
NOTE: ALL ADJACENT PARCELS ARE ZONED JT/RL

EARTHWORK

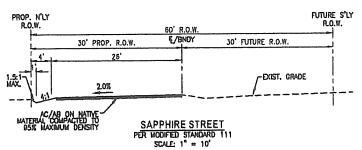
	CUT (C.Y.)	FILL (C.Y.)
RAW EARTHWORK:	14,820	7,830
OVEREX & RECOMPACT:	29,200	29,200
SUBSIDENCE (0.1'):	-(1,300)	-0
SUBTOTAL:	42,320	0
SHRINKAGE (12.5%):	(5,280)	-0
SURFACE DRAINGS & OTHER LOSSES	---	0
TOTAL:	37,030	37,030
NET IMPORT/EXPORT = 0 (C.Y.)	---	0



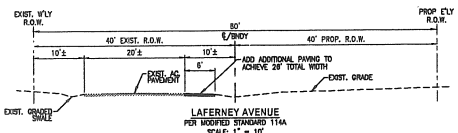
EAST BROADWAY
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



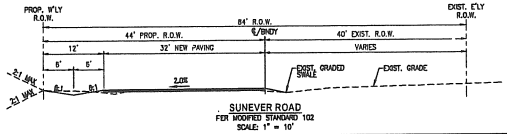
DELAWARE AVENUE, CALIFORNIA AVENUE, & ARIZONA STREET
PER MODIFIED STANDARD 104A
SCALE: 1" = 10'



SAPPHIRE STREET
PER MODIFIED STANDARD 111
SCALE: 1" = 10'



LAFERNEY AVENUE
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



SUNEVER ROAD
PER MODIFIED STANDARD 102
SCALE: 1" = 10'

ENGINEER'S STATEMENT

THIS TENTATIVE TRACT MAP WAS PREPARED UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, ALL EASEMENTS OF RECORD ARE SHOWN PER THE TITLE REPORT DATED _____ BY _____ TITLE COMPANY.

RICHARD DAIL REAVES, RCE 80814 DATE

DRAINAGE NOTE

CROSS-LOT DRAINAGE EXISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL AGREE TO ACCEPT RUNOFF FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED RUNOFF IS NOT ALTERED. EACH LOT OWNER SHALL AGREE NOT TO ALTER THE QUANTITY OR QUALITY OF THE RUNOFF FROM THEIR LOT ONTO THE ADJACENT PROPERTY. NO LOT GRADING WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAD GRADING, SWALES AND RUNOFF MITIGATION.

ENGINEER

ADKAN ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA 92504
CONTACT: RICHARD REAVES
PHONE: (951) 688-0241
EMAIL: RREAVES@ADKAN.COM

OWNER/APPLICANT

KIM CHEN
J.T. SANTORI VILLA LLC
1751 COLORADO BLVD., #333
LOS ANGELES, CA 90041
PHONE: (626) 673-2872
EMAIL: kim@surveyandeng.com

Underground Service Alert
Call TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0509
RICHARD DAIL REAVES R.C.E. 80814 DATE EXP. 03-31-27

REGISTERED PROFESSIONAL ENGINEER RICHARD DAIL REAVES NO. 80814 EXP. 03/31/27 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF LAND USE SERVICES

RECOMMENDED BY: _____ DATE

APPROVED BY: _____ DATE

TENTATIVE TRAC.T MAP

TRAC.T No. 20668
APN: 0605-051-01
JOSHUA TREE

DATE PREPARED: 7/19/2024
DATE:
FILE NO.
SHEET 1 OF 1

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863
www.Sladdenengineering.com

January 10, 2023

Project No. 544-22471
23-01-015

1.0 DESCRIPTION OF SITE AND PROPOSAL

1.1 Four Star Realty
c/o Ms. Kim Chen
2939 Leward Avenue, Unit 201
Los Angeles, California 90005

Project: Proposed Joshua Tree Estates
SEC East Broadway Street & Laferney Avenue
APN 0605-051-01
Joshua Tree Area
San Bernardino County, California

Subject: Percolation Testing for Onsite Sewage Disposal Feasibility

1.2. Location:

The project site is located on the southeast corner of East Broadway Street and Laferney Avenue in the Joshua Tree area of San Bernardino County, California. The project site consists of a single parcel that is formally identified by the County of San Bernardino County as APN 0605-051-01. The parcel occupies approximately 80 acres of undeveloped land. The site is near the elevation of the adjacent properties and roadways and is located at approximately 34.1623 degrees north latitude and 116.2690 degrees west longitude (Figure 1). The parcel is bounded by East Broadway Street to the north, Laferney Avenue to the west, Sunever Road to the east and undeveloped land to the immediate south.

1.3 Proposed Development:

a) It is our understanding that the proposed project will consist of constructing a 32 lot residential development on the subject parcel. Each residential lot will consist of approximately 2 acres. Concrete flatwork, landscape areas and various associated site improvements are also anticipated. Private on-site sewage disposal systems consisting of septic tanks and leach lines are proposed to serve each lot.

San Bernardino County Department of Public Health
Division of Environmental Health Services

Percolation Report EHS REF# SR0140335

DESIGN RATE: 55 **square feet per 100 gallons septic tank capacity**

This rate applies to:
☐ Location(s) where tested ☑ Leach lines/bed ☐ Seepage pits
☐ Replacement only ☑ Entire lot/subdivision ☐ Limited to:

Additional requirements:
☐ Maintain septic tank minimum _____ ft setback from _____
☐ Maintain disposal area minimum _____ ft setback from _____
☐ New construction requires perc test ☐ Clearance from _____ RWQCB
☐ EHS special conditions apply

CONSTRUCTION DETAILS SUBJECT TO BUILDING AND SAFETY APPROVAL

Design Rate Issued By: Iliana Olguin Iliana Olguin Date: 4/16/26

a) Surface gradients in the on the subject parcel descend to the northeast at inclinations of ten horizontal to one vertical (10H:1V) and less. Surface gradients descend to the northeast with elevations ranging from approximately 2,520 to 2,475 feet above mean sea level from the southwest to northeast, respectively (MSL)[1].

b) No natural ponding of water or surface seeps were observed at or near the site during our investigation conducted on December 5, 2022. Site drainage appears to be controlled via sheet flow and surface infiltration. Shallowly incised drainage courses transect the site from approximately Lot 12 northeast to Lot 32. ***Project planners should understand that the new disposal systems must be located a minimum of 25 feet from the from the edge of the 100 year flow boundary in accordance with County of San Bernardino guidelines.***

c) It is assumed that the properties within the vicinity of the project site are utilizing individual on-site sewage disposal systems consisting of septic tanks and leach lines or seepage pits.

d) At the time of our investigation the parcel was undeveloped, and no wells were identified on the property. The property is serviced by the Joshua Basin Water District.

e) No bedrock outcrops were observed on the subject property or in the immediate site vicinity.

f) Bedrock was not encountered within the exploratory bores and test holes excavated to a maximum depth of approximately 26 feet bgs.

g) Groundwater was not encountered within our exploratory bores or test holes that extended to a maximum explored depth of approximately 26 feet bgs. Information regarding the approximate depth to groundwater provided by the California Department of Water Resources[2] online database suggests that the groundwater should be in excess of 200 feet below the existing ground surface in the vicinity of the site. The following table provides a summary of the recorded historic high groundwater depths in the project vicinity.

TABLE 1
GROUNDWATER DEPTHS

STATE WELL	LAT/LONG	DISTANCE (KM)	DATE	DEPTH (FT)
01N07E17Q001S	34.165/-116.2736	0.50	05/03/1994	Dry Well
01N07E16P001S	34.1656/-116.2578	1.10	04/20/1968	262.7
01N07E21Q001S	34.1506/ -116.2528	1.98	04/16/1947	286.9
01N07E20P002S	34.1524/-116.2738	1.20	05/11/2006	375
01N07E21J001S	34.1539/-116.25	2.00	04/25/1956	258.7
01N07E22E001S	34.1572/-116.2475	2.05	03/27/1958	259.08
01N07E22D001S	34.1631/-116.2464	2.10	02/10/1998	233.39

h) Site geologic features are not expected have a significant impact on sewage disposal system design.

i) It appears that there will be sufficient area for the on-site sewage disposal systems and the required expansion areas on the subject site.

[1] United States Geological Survey (USGS), 2018, Joshua Tree North Quadrangle, California-San Bernardino County, 7.5 Minute Series.
[2] California Department of Water Resources, 2023, Water Data Library; available at: https://wdl.water.ca.gov/waterdatalibrary/

2.0 EQUIPMENT

a) Seventeen (17) exploratory bores and seventeen (17) percolation test holes were excavated on the subject property using a track mounted limited access drill-rig (CME 75) equipped with 8-inch outside diameter augers and a John Deere 30 excavator equipped with a 24 inch wide bucket and an 8-inch outside diameter solid stem augers attachment.
b) Tools used during testing consisted of a water level measuring device, a multi-timer application and a 500-gallon truck mounted water tank.

3.0 METHODOLOGY AND PROCEDURES

3.1 The exploratory bores and test hole locations were determined by a handheld Global Positioning System (GPS). The approximate locations of the exploratory bores and test holes are indicated on the attached Exploration Location Plan (Figure 3).

3.2 The test results and soil conditions encountered during our site exploration indicated "favorable" conditions throughout the subject property. The rapid percolation test rates determined by testing were consistent with the alluvial soil conditions observed throughout the subject property. The surface gradient throughout the site is less than 30 percent.

3.3 The soil encountered in our bores and test holes consisted primarily of fine- to coarse-grained silty sand (SM) and poorly graded sand (SP).

3.4 Test procedures for leach lines:

a) Prior to testing, the County of San Bernardino DEHS was notified of the intent to perform percolation testing. The notification was submitted on November 16, 2022 via email.
b) Seventeen (17) exploratory bores and seventeen (17) leach line percolation test holes were excavated on the site to depths between approximately 5 and 26 feet bgs. Percolation testing was performed at a depth of approximately 5.0 feet bgs within each of the test holes. Two (2) inches of ½ inch gravel was placed on the bottom of the test holes to prevent scouring when water was added.
c) Twelve inches of water (10 inches above gravel) of water was placed in the test holes and the drop in the water level was recorded over two consecutive 10-minute readings. Because 10 inches of water percolated through the test holes within two consecutive readings, testing was initiated immediately.
d) Percolation testing was performed by filling each test hole with approximately 8 inches of water and recording the time required to drop 3-inches in accordance with San Bernardino County OWTS guidelines[3].

[3] San Bernardino Public Health, Environmental Health Services, Percolation Testing and Reporting Standards for Onsite Wastewater Treatment Systems, Revised September 2019.

3.5 Leach line Test Results

TABLE 2
LEACH LINE TEST RESULTS

Lot No.	Test Hole No.	Depth (Ft.)	Q minutes/inch	Minimum Square Feet of Absorption Area Per Gallon Per Day
32	P-1	5.0	1.50	0.83
27	P-2	5.0	1.55	0.83
29	P-3	5.0	1.67	0.83
21	P-4	5.0	1.42	0.83
22	P-5	5.0	1.32	0.83
23	P-6	5.0	1.35	0.83
26	P-7	5.0	1.52	0.83
18	P-8	5.0	1.35	0.83
2	P-9	5.0	1.28	0.83
3	P-10	5.0	1.38	0.83
5	P-11	5.0	1.30	0.83
8	P-12	5.0	1.27	0.83
10	P-13	5.0	1.17	0.83
12	P-14	5.0	1.37	0.83
14	P-15	5.0	1.92	0.83
16	P-16	5.0	1.57	0.83
19	P-17	5.0	1.53	0.83

4.0 DISCUSSION OF RESULTS

4.1 Testing indicates rapid percolation rates between 1.17 and 1.92 minutes per inch that are consistent with the alluvium encountered within the exploratory bores and test holes.

4.2 The recorded measurements are considered accurate, and the consistency of the individual test results indicates accuracy.

5.0 DESIGN

5.1 Criteria:

a) Leach lines may be designed based on an application rate of 0.83 square feet per gallon per day in accordance with San Bernardino County DEHS guidelines.
b) Design Rate: The following calculation may be utilized to determine the design rate in square feet (ft^2) per 100 gallons of septic tank capacity (gstc):

= Application Rate (ft^2/gal/day)* Flow (gal)/(Septic Tank Size/100 gal)

Design Rate not to be taken at less than **55 ft^2 per 100 gstc**

c) The project was in the preliminary design stages at the time of this report. Therefore, project plans were not available. Preliminary information to assist in the design of the on-site sewage disposal systems is presented below:

OWTS DESIGN

Standard Design (3 Ft of Gravel Below Leach Lines)

Number of Bedrooms	1-2	3	4	5-6
Application Rate (ft2/gal/day)	0.83	0.83	0.83	0.83
Gallons of Effluent Per Day	500	670	800	1,000
Gallons of Septic Tank Capacity	750	1,000	1,200	1,500
Absorption Area (ft2):	415	556	664	830
Trench Credit (ft2 per ft):	7	7	7	7
Total Leach Line Length (ft	60	80	95	119
Number of Leach Lines	2 @ 30 Ft.	2 @ 40 Ft.	2 @ 48 Ft.	3 @ 40 Ft.

6.0 SEE EXPLORATION LOCATION PLAN

7.0 GENERAL DISCUSSION AND CONCLUSIONS

7.1 Based on the data presented in the report, it is the judgment of this engineer that leach lines may be used for the sewage disposal on this property.

7.2 Based on the data presented in this report and the tested information accumulated, it is the judgment of the engineer that the groundwater table should not encroach with the allowable limit set forth by County and State requirements, when the recommendations of this report are followed. Also, there appears to be sufficient area on each proposed parcel for the proposed on-site sewage disposal systems and future expansion.

7.3 All minimum setback distances shall be maintained for the proposed sewage disposal system in accordance with San Bernardino County guidelines[4].

8.0 GENERAL

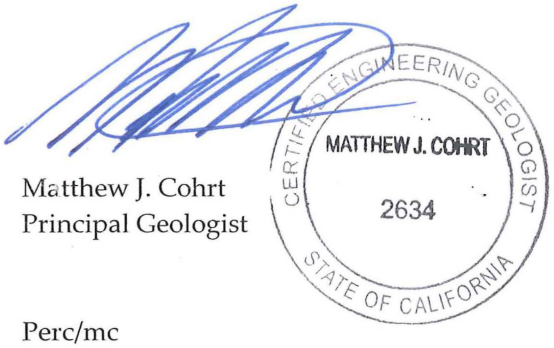
The findings and recommendations presented in this report are based upon an interpolation of the soil conditions between bore locations and extrapolation of the conditions throughout the sewage disposal system areas. Should conditions encountered during grading (or excavation) appear different than that indicated in this report, this office should be notified.

[4] San Bernardino Public Health, Environmental Health Services, Percolation Testing and Reporting Standards for Onsite Wastewater Treatment Systems, Revised September 2019; Appendix D.

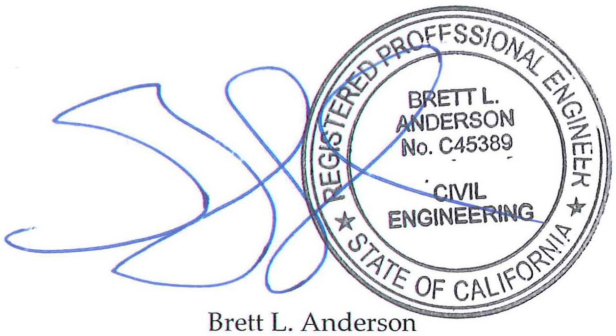
This report is considered applicable for use by the client for the specific site and project described herein. The use of this report by other parties or for other projects is not authorized.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING



Matthew J. Cohrt
Principal Geologist



Brett L. Anderson
Principal Engineer

Perc/mc
PDF/Addressee

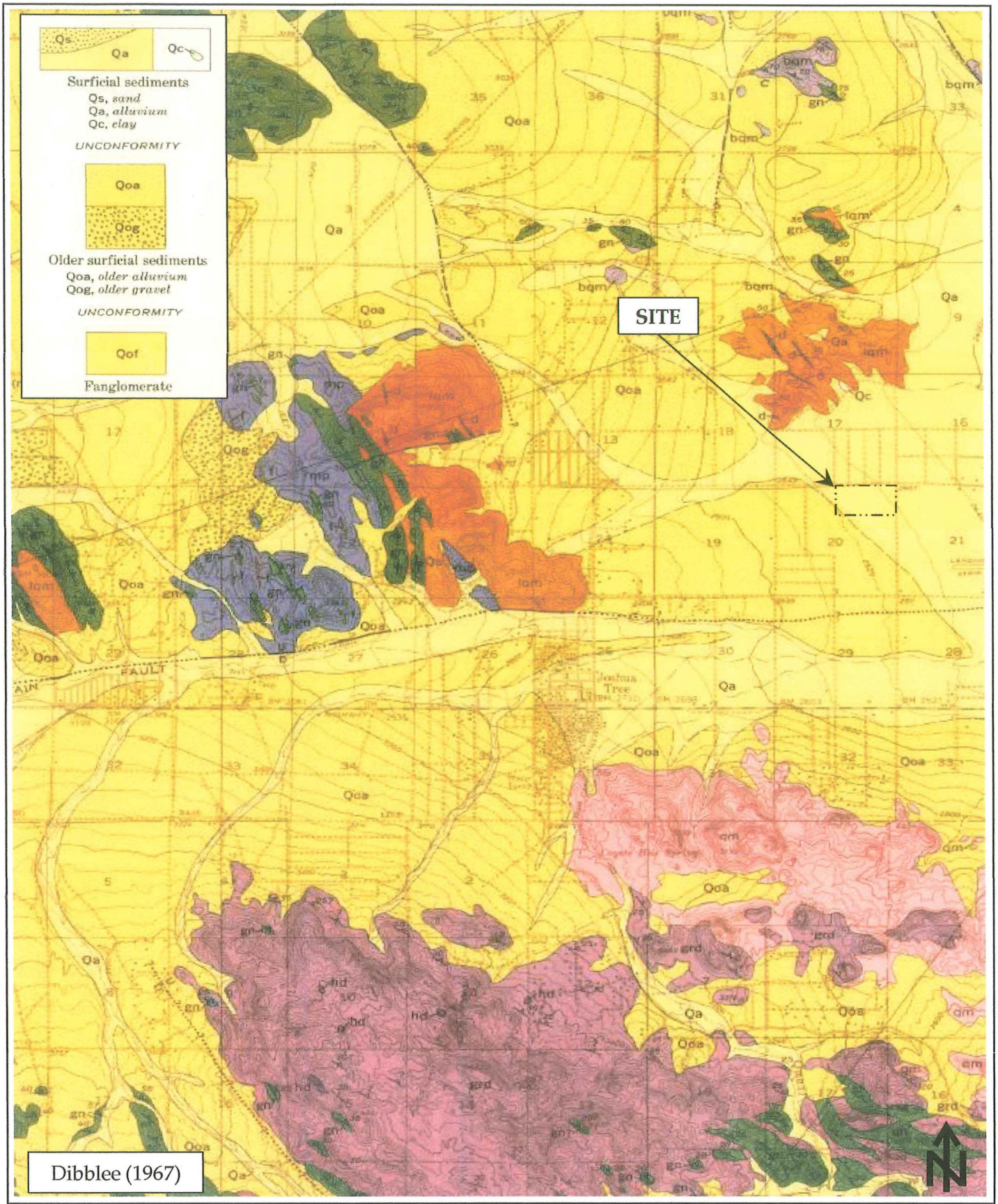
SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
EXPLORATION LOCATION PLAN
FAULT ZONE MAP

SITE LOCATION MAP

Project Number:	544-22471
Report Number:	23-01-015
Date:	January 10, 2023

FIGURE 1

Sladden Engineering

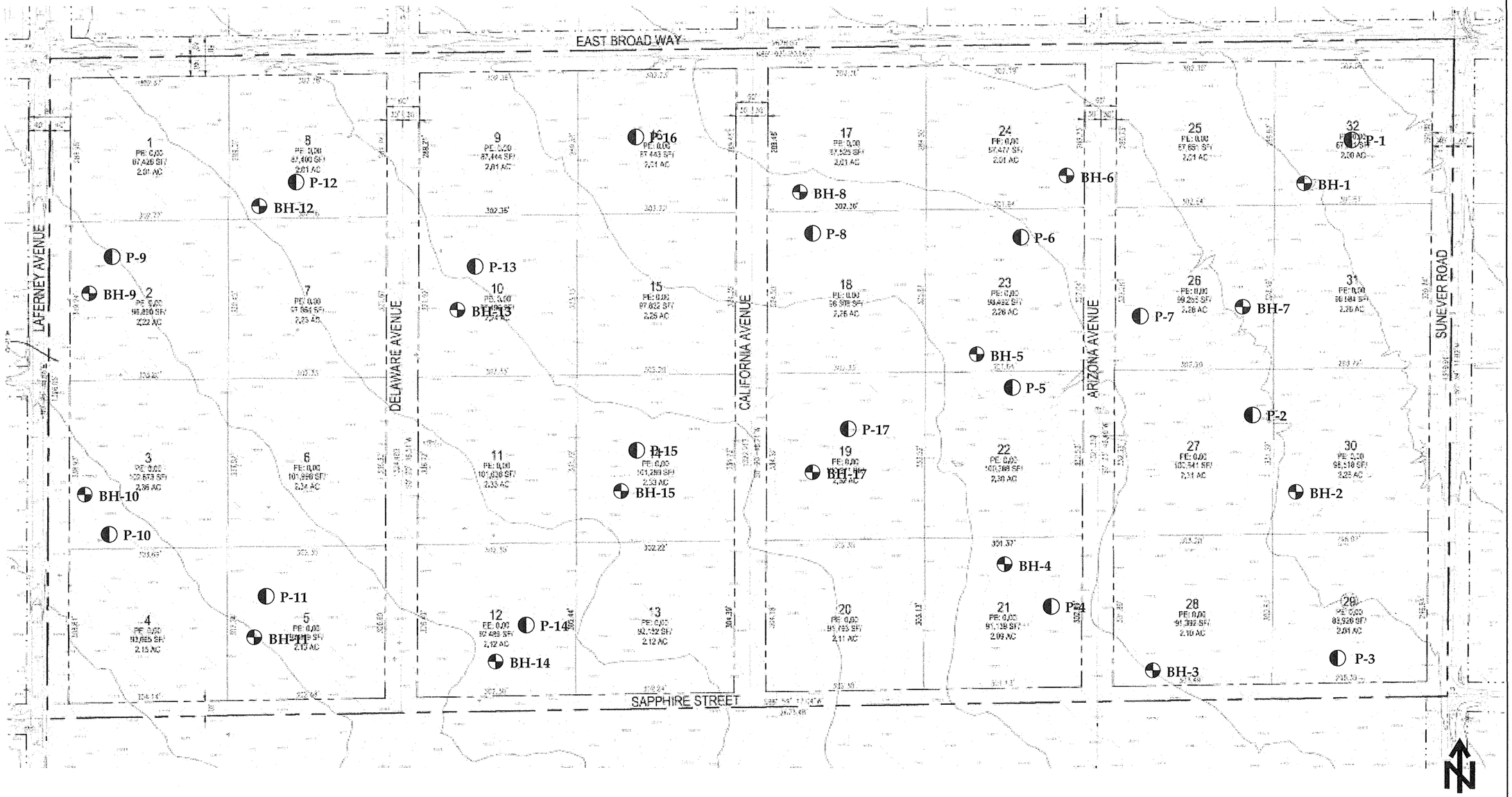


REGIONAL GEOLOGIC MAP

FIGURE 2

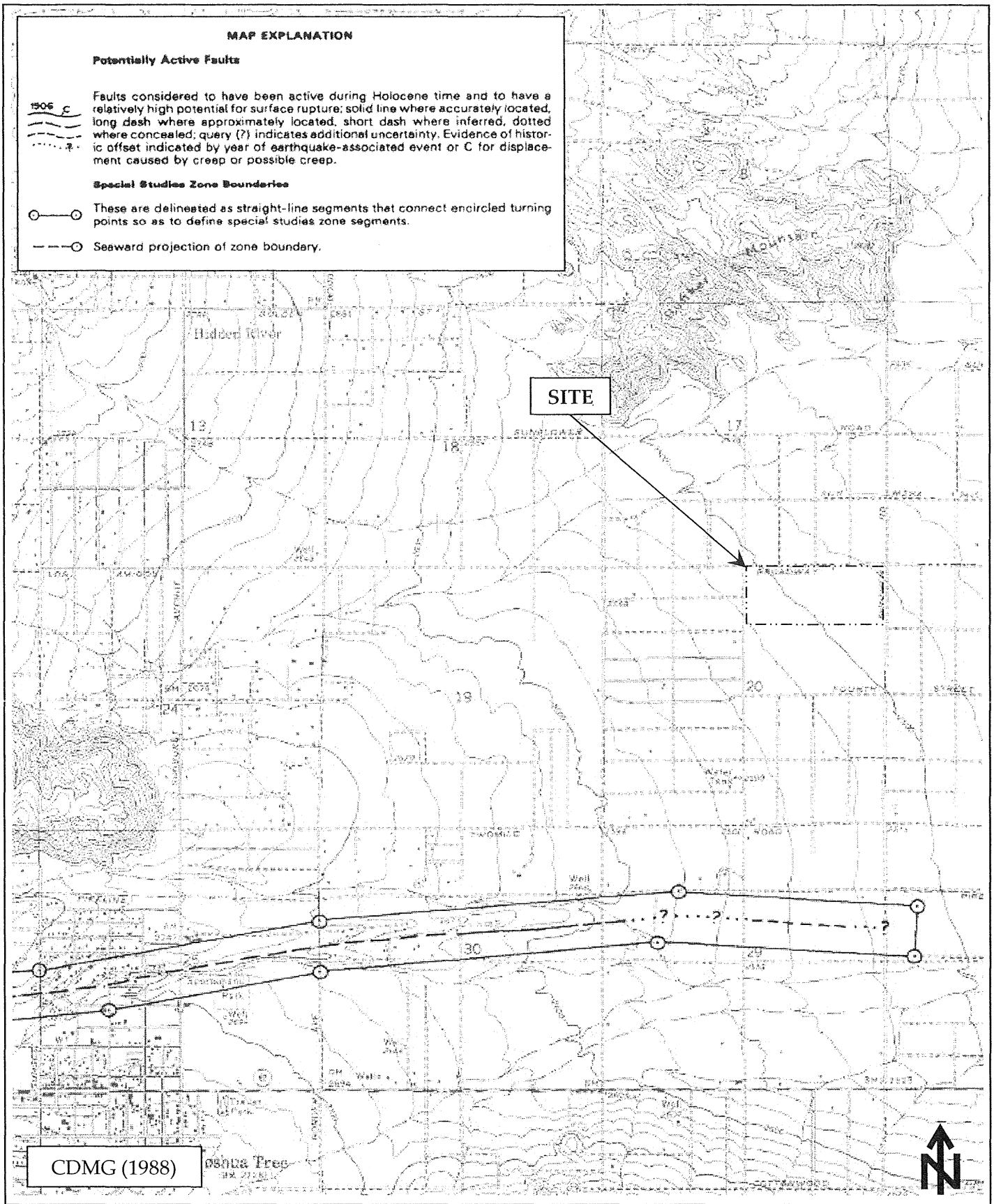
Project Number:	544-22471
Report Number:	23-01-015
Date:	January 10, 2023

Sladden Engineering



LEGEND	
BH-17	Borehole Location
P-17	Percolation Test Location

Sladden Engineering	EXPLORATION LOCATION PLAN		FIGURE
	Project Number:	544-22471	3
	Report Number:	23-01-015	
	Date:	January 10, 2023	



Sladden Engineering	FAULT ZONE MAP	FIGURE 4
	Project Number:	544-22471
	Report Number:	23-01-015
	Date:	January 10, 2023

BORELOGS

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
■	7 11 15	1	0	14.0	1.0	114.2	2		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	10 12 13			14.8	1.2	108.1	6		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	4 5 6			9.9	1.2		10		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
■	16 29 38			6.5	0.6	117.2	16		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained (Qa).
■	6 9 15			17.7	1.9		20		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
■	27 43 55			3.2	0.5		26		Sand (SW); yellowish brown, dry, very dense, fine- to coarse-grained with calcium carbonate stringers (Qa).
							28		Terminated at ~26.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	5 6 7			19.3	1.7		6		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
	6 14 18			14.4	1.0	108.9	10		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	12 14 14			6.5	1.0		16		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
									Terminated at ~16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	6 7 8			2.4	0.3		6		Sand (SW); yellowish brown, dry, loose, fine- to coarse-grained with gravel (Qa).
	9 11 21			7.1	1.5		10		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
	12 26 34			5.6	0.9	115.9	16		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
	16 18 20			8.7	1.4		20		Sand (SW); yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
							22		Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	3 4 4			13.9	2.3		6		Silty Sand (SM); yellowish brown, dry, loose, fine- to coarse-grained with gravel (Qa).
	5 11 16			7.1	0.9	107.5	10		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
							12		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	12 20 22			4.8	0.6		6		Sand (SW); yellowish brown to grayish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	5 6 8			9.5	1.0		10		Sand (SW); yellowish brown to grayish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	8 11 28			2.5	0.3		16		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	9 11 14			5.6	0.8		20		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	19 33 29			3.5	0.4		26		Sand (SW); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
							28		Terminated at ~26.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-6

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	12 17 24			17.4	1.1	112.3	6		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
	7 9 12			6.9	0.9		10		Sand (SP); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
	12 16 21			4.0	0.4	115.0	16		Sand (SP); yellowish brown, dry, medium dense, fine- to coarse-grained (Qa).
									Terminated at ~16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-7

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
							2		
							4		
	5 6 8			8.4	0.8		6		Sand (SP); grayish brown, dry, medium dense, fine- to coarse-grained (Qa).
							8		
	10 14 17			14.2	1.0	121.0	10		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
							12		
							14		
	10 16 18			5.6	0.6		16		Sand (SP); grayish brown to yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
							18		
	16 22 27			5.4	0.4	111.1	20		Sand (SP); grayish brown to yellowish brown, dry, dense, fine- to coarse-grained with gravel (Qa).
							22		
							24		Terminated at ~16.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-8

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
	13 26 23			6.7	0.4	121.9	6		Sand (SP); yellowish brown to grayish brown, dry, dense, fine- to coarse-grained (Qa).
	4 8 9			10.1	1.0		10		Sand (SW); grayish brown, dry, medium dense, fine- to coarse-grained with gravel (Qa).
							12		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-9

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~7.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-10

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~7.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-11

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		
							10		Terminated at ~8.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471

Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-12

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Sand (SP); grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~8.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-13

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~8.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-14

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2, 4, 6, 8		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained (Qa).
							10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50		Terminated at ~9.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-15

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		
							10		Terminated at ~8.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-16

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~6.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	BH-17

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		
							8		Terminated at ~7.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-6

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-7

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	11/22/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-8

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-9

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-10

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-11

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-12

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-13

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2–4		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							6–50		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-14

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-15

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-16

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471
Report No: 23-01-015

Sladden Engineering

BORE LOG

Equipment:	John Deere 30	Date Drilled:	12/15/2022
Elevation:	2,500 Ft. MSL	Boring No:	P-17

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand (SM) to Sand (SP); yellowish brown to grayish brown, dry, fine- to coarse-grained with gravel (Qa).
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED 32 LOT RESIDENTIAL DEVELOPMENT
EAST BROADWAY STREET, JOSHUA TREE AREA

Project No: 544-22471

Report No: 23-01-015

LEACH LINE DATA SHEETS

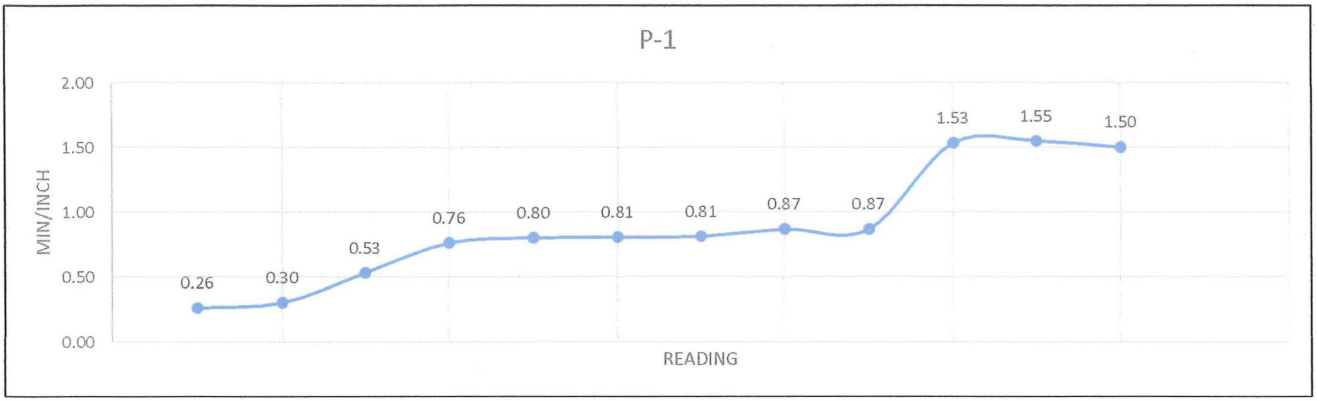
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-1
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	10:00:00	10:03:07	0:03:07	5.00	12	0	12	0.26
B	10:04:00	10:07:36	0:03:36	5.00	12	0	12	0.30
C	10:08:15	10:10:54	0:02:39	5.00	8	3	5	0.53

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	10:11:30	10:13:47	0:02:17	5.00	8	5	3	0.76
2	10:14:30	10:16:54	0:02:24	5.00	8	5	3	0.80
3	10:17:30	10:19:55	0:02:25	5.00	8	5	3	0.81
4	10:20:30	10:22:56	0:02:26	5.00	8	5	3	0.81
5	10:23:30	10:26:06	0:02:36	5.00	8	5	3	0.87
6	10:27:00	10:29:36	0:02:36	5.00	8	5	3	0.87
7	10:30:15	10:31:47	0:01:32	5.00	8	7	1	1.53
8	10:32:15	10:33:48	0:01:33	5.00	8	7	1	1.55
9	10:34:15	10:35:45	0:01:30	5.00	8	7	1	1.50

*Initial Water level of 8-inches



Rate (Min/Inch): 1.50

Sladden Engineering

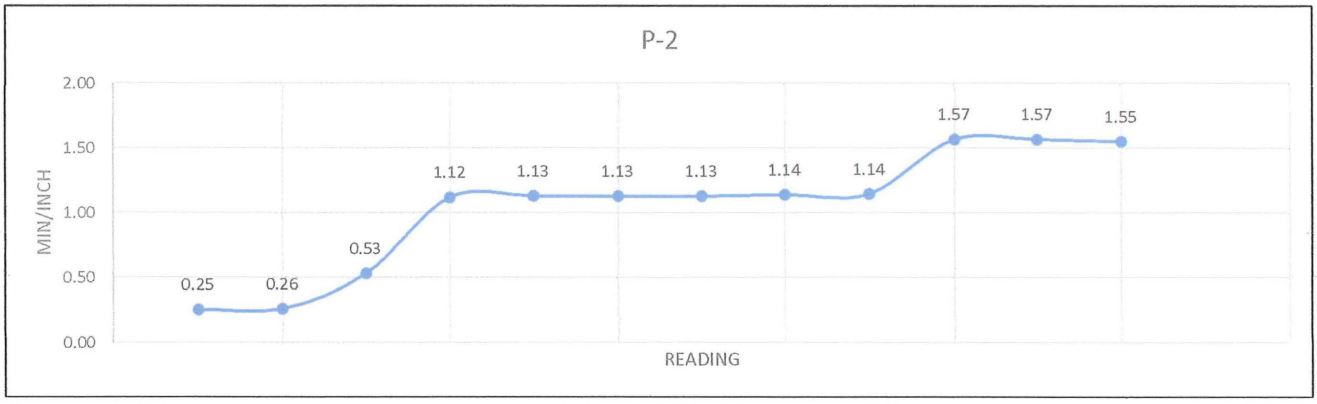
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-2
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	10:40:00	10:43:02	0:03:02	5.00	12	0	12	0.25
B	10:44:00	10:47:06	0:03:06	5.00	12	0	12	0.26
C	10:48:15	10:50:54	0:02:39	5.00	8	3	5	0.53

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	10:51:00	10:54:21	0:03:21	5.00	8	5	3	1.12
2	10:55:30	10:58:53	0:03:23	5.00	8	5	3	1.13
3	10:59:30	11:02:53	0:03:23	5.00	8	5	3	1.13
4	11:04:00	11:07:23	0:03:23	5.00	8	5	3	1.13
5	11:08:15	11:11:40	0:03:25	5.00	8	5	3	1.14
6	11:12:15	11:15:41	0:03:26	5.00	8	5	3	1.14
7	11:17:15	11:18:49	0:01:34	5.00	8	7	1	1.57
8	11:19:15	11:20:49	0:01:34	5.00	8	7	1	1.57
9	11:21:15	11:22:48	0:01:33	5.00	8	7	1	1.55

*Initial Water level of 8-inches



Rate (Min/Inch): 1.55

Sladden Engineering

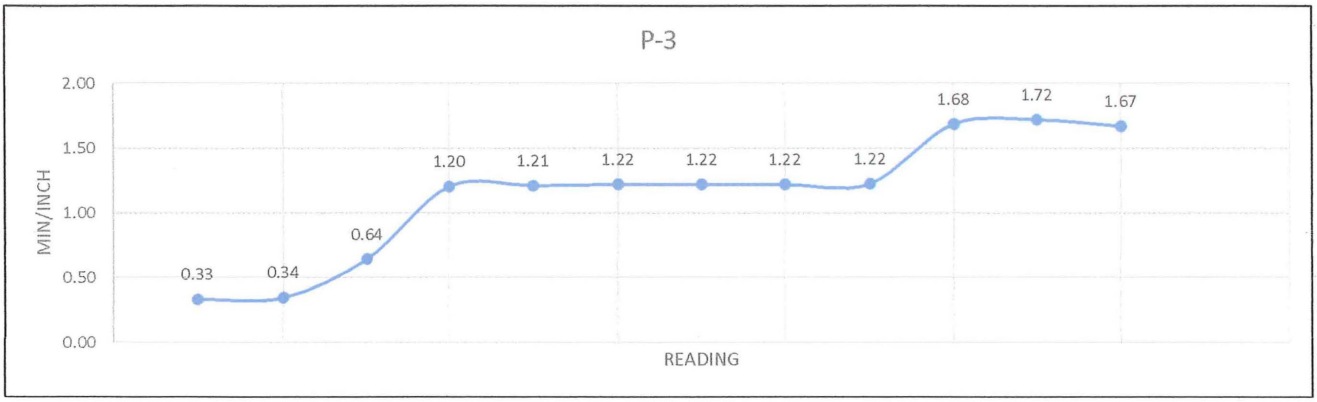
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-3
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	11:28:00	11:31:57	0:03:57	5.00	12	0	12	0.33
B	11:32:15	11:36:22	0:04:07	5.00	12	0	12	0.34
C	11:37:15	11:40:27	0:03:12	5.00	8	3	5	0.64

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	11:31:30	11:35:06	0:03:36	5.00	8	5	3	1.20
2	11:36:30	11:40:07	0:03:37	5.00	8	5	3	1.21
3	11:41:00	11:44:39	0:03:39	5.00	8	5	3	1.22
4	11:45:15	11:48:54	0:03:39	5.00	8	5	3	1.22
5	11:49:20	11:52:59	0:03:39	5.00	8	5	3	1.22
6	11:53:35	11:57:15	0:03:40	5.00	8	5	3	1.22
7	11:59:00	12:00:41	0:01:41	5.00	8	7	1	1.68
8	12:01:00	12:02:43	0:01:43	5.00	8	7	1	1.72
9	12:03:00	12:04:40	0:01:40	5.00	8	7	1	1.67

*Initial Water level of 8-inches



Rate (Min/Inch): 1.67

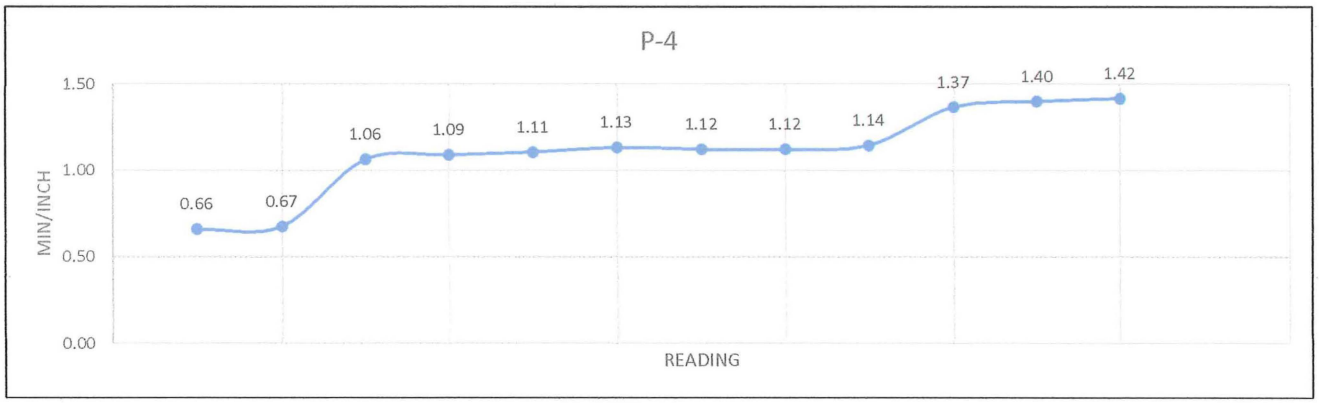
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-4
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	12:10:00	12:17:54	0:07:54	5.00	12	0	12	0.66
B	12:18:45	12:26:51	0:08:06	5.00	12	0	12	0.67
C	12:28:00	12:33:19	0:05:19	5.00	8	3	5	1.06

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	12:34:00	12:37:16	0:03:16	5.00	8	5	3	1.09
2	12:38:00	12:41:19	0:03:19	5.00	8	5	3	1.11
3	12:42:00	12:45:24	0:03:24	5.00	8	5	3	1.13
4	12:46:00	12:49:22	0:03:22	5.00	8	5	3	1.12
5	12:50:15	12:53:37	0:03:22	5.00	8	5	3	1.12
6	12:54:00	12:57:26	0:03:26	5.00	8	5	3	1.14
7	13:00:00	13:01:22	0:01:22	5.00	8	7	1	1.37
8	13:02:00	13:03:24	0:01:24	5.00	8	7	1	1.40
9	13:04:00	13:05:25	0:01:25	5.00	8	7	1	1.42

*Initial Water level of 8-inches



Rate (Min/Inch): 1.42

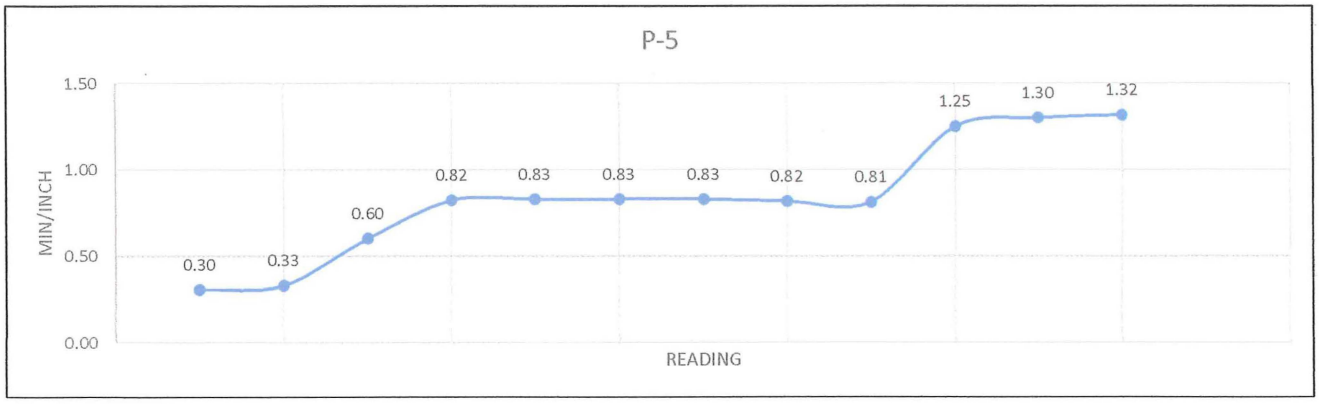
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-5
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	13:10:00	13:13:39	0:03:39	5.00	12	0	12	0.30
B	13:14:10	13:18:06	0:03:56	5.00	12	0	12	0.33
C	13:19:00	13:22:00	0:03:00	5.00	8	3	5	0.60

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	13:23:00	13:25:28	0:02:28	5.00	8	5	3	0.82
2	13:25:55	13:28:24	0:02:29	5.00	8	5	3	0.83
3	13:30:00	13:32:29	0:02:29	5.00	8	5	3	0.83
4	13:33:10	13:35:39	0:02:29	5.00	8	5	3	0.83
5	13:36:15	13:38:42	0:02:27	5.00	8	5	3	0.82
6	13:40:10	13:42:36	0:02:26	5.00	8	5	3	0.81
7	13:44:00	13:45:15	0:01:15	5.00	8	7	1	1.25
8	13:46:10	13:47:28	0:01:18	5.00	8	7	1	1.30
9	13:48:00	13:49:19	0:01:19	5.00	8	7	1	1.32

*Initial Water level of 8-inches



Rate (Min/Inch): 1.32

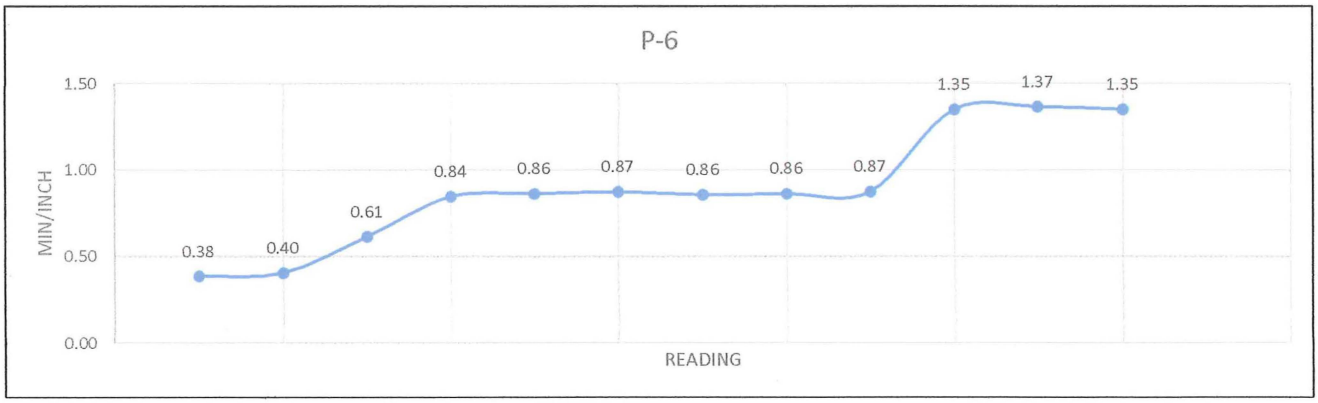
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-6
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	14:05:00	14:08:50	0:03:50	5.00	12	2	10	0.38
B	14:10:00	14:14:02	0:04:02	5.00	12	2	10	0.40
C	14:16:00	14:19:04	0:03:04	5.00	8	3	5	0.61

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	14:20:15	14:22:47	0:02:32	5.00	8	5	3	0.84
2	14:23:15	14:25:50	0:02:35	5.00	8	5	3	0.86
3	14:26:30	14:29:07	0:02:37	5.00	8	5	3	0.87
4	14:31:10	14:33:44	0:02:34	5.00	8	5	3	0.86
5	14:34:10	14:36:45	0:02:35	5.00	8	5	3	0.86
6	14:37:30	14:40:07	0:02:37	5.00	8	5	3	0.87
7	14:41:00	14:42:21	0:01:21	5.00	8	7	1	1.35
8	14:44:00	14:45:22	0:01:22	5.00	8	7	1	1.37
9	14:46:00	14:47:21	0:01:21	5.00	8	7	1	1.35

*Initial Water level of 8-inches



Rate (Min/Inch): 1.35

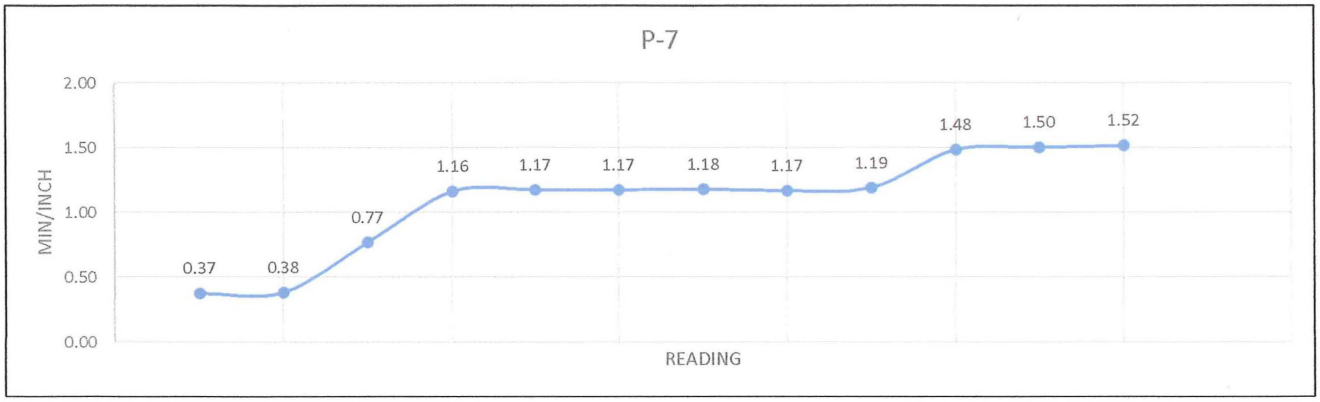
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-7
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	14:48:10	14:52:39	0:04:29	5.00	12	0	12	0.37
B	14:53:10	14:57:44	0:04:34	5.00	12	0	12	0.38
C	14:58:15	15:02:05	0:03:50	5.00	8	3	5	0.77

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	15:03:10	15:06:39	0:03:29	5.00	8	5	3	1.16
2	15:07:30	15:11:01	0:03:31	5.00	8	5	3	1.17
3	15:13:10	15:16:41	0:03:31	5.00	8	5	3	1.17
4	15:17:10	15:20:42	0:03:32	5.00	8	5	3	1.18
5	15:21:15	15:24:45	0:03:30	5.00	8	5	3	1.17
6	15:25:10	15:28:44	0:03:34	5.00	8	5	3	1.19
7	15:29:15	15:30:44	0:01:29	5.00	8	7	1	1.48
8	15:31:15	15:32:45	0:01:30	5.00	8	7	1	1.50
9	15:33:15	15:34:46	0:01:31	5.00	8	7	1	1.52

*Initial Water level of 8-inches



Rate (Min/Inch): 1.52

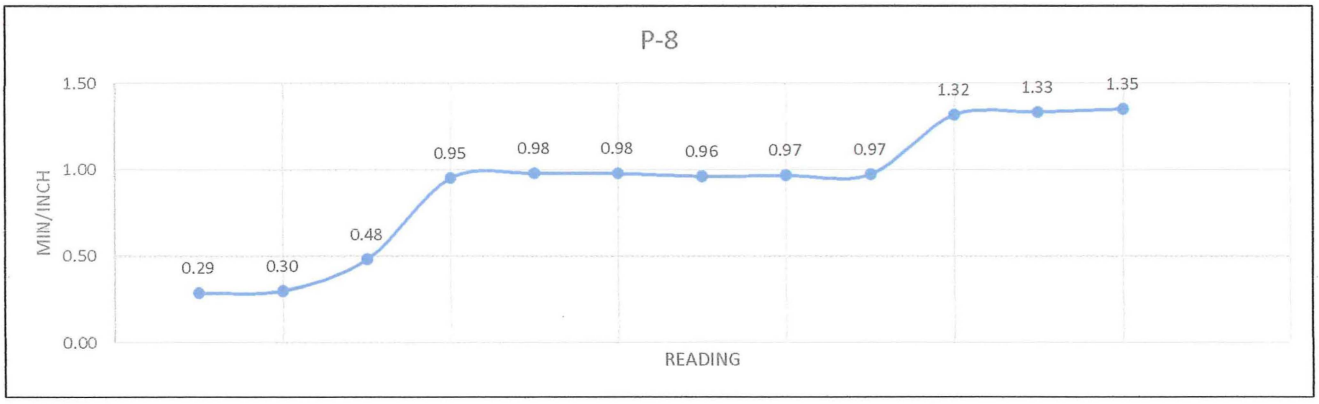
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/10/2022
Test Hole #: P-8
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	15:45:00	15:48:26	0:03:26	5.00	12	0	12	0.29
B	15:51:00	15:54:34	0:03:34	5.00	12	0	12	0.30
C	15:55:15	15:57:39	0:02:24	5.00	8	3	5	0.48

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	16:05:00	16:07:51	0:02:51	5.00	8	5	3	0.95
2	16:09:00	16:11:56	0:02:56	5.00	8	5	3	0.98
3	16:13:00	16:15:56	0:02:56	5.00	8	5	3	0.98
4	16:16:15	16:19:08	0:02:53	5.00	8	5	3	0.96
5	16:20:00	16:22:54	0:02:54	5.00	8	5	3	0.97
6	16:23:30	16:26:25	0:02:55	5.00	8	5	3	0.97
7	16:27:00	16:28:19	0:01:19	5.00	8	7	1	1.32
8	16:29:15	16:30:35	0:01:20	5.00	8	7	1	1.33
9	16:31:10	16:32:31	0:01:21	5.00	8	7	1	1.35

*Initial Water level of 8-inches



Rate (Min/Inch): 1.35

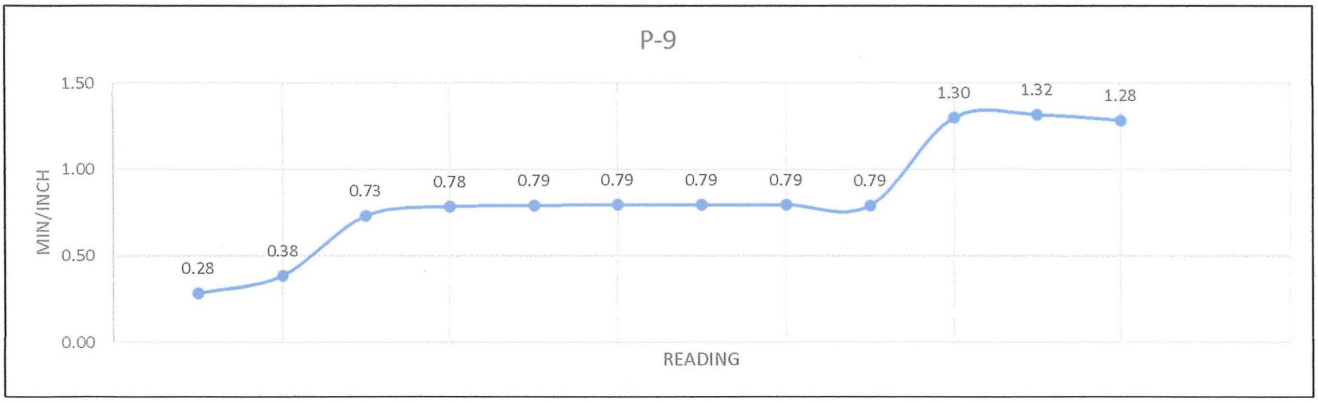
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-9
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	9:15:00	9:18:23	0:03:23	5.00	12	0	12	0.28
B	9:21:10	9:25:45	0:04:35	5.00	12	0	12	0.38
C	9:26:10	9:29:49	0:03:39	5.00	8	3	5	0.73

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	9:30:30	9:32:51	0:02:21	5.00	8	5	3	0.78
2	9:33:00	9:35:22	0:02:22	5.00	8	5	3	0.79
3	9:36:10	9:38:33	0:02:23	5.00	8	5	3	0.79
4	9:39:15	9:41:38	0:02:23	5.00	8	5	3	0.79
5	9:42:00	9:44:23	0:02:23	5.00	8	5	3	0.79
6	9:45:00	9:47:22	0:02:22	5.00	8	5	3	0.79
7	9:48:10	9:49:28	0:01:18	5.00	8	7	1	1.30
8	9:50:00	9:51:19	0:01:19	5.00	8	7	1	1.32
9	9:52:09	9:53:26	0:01:17	5.00	8	7	1	1.28

*Initial Water level of 8-inches



Rate (Min/Inch): 1.28

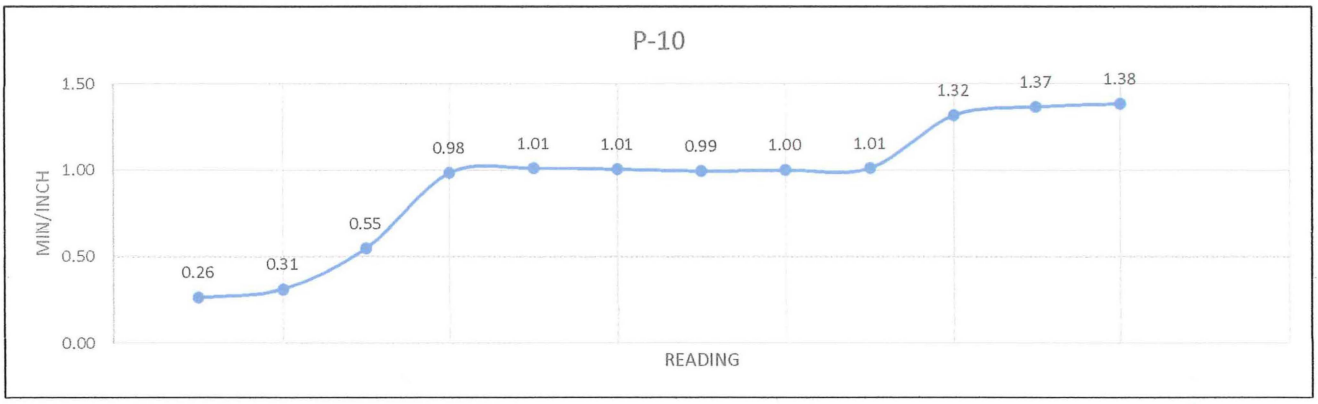
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-10
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	10:15:00	10:18:09	0:03:09	5.00	12	0	12	0.26
B	10:18:45	10:22:28	0:03:43		12	0	12	0.31
C	10:22:50	10:25:34	0:02:44		8	3	5	0.55

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	10:27:15	10:30:12	0:02:57	5.00	8	5	3	0.98
2	10:31:10	10:34:12	0:03:02	5.00	8	5	3	1.01
3	10:35:00	10:38:01	0:03:01	5.00	8	5	3	1.01
4	10:38:45	10:41:44	0:02:59	5.00	8	5	3	0.99
5	10:42:15	10:45:15	0:03:00	5.00	8	5	3	1.00
6	10:46:10	10:49:12	0:03:02	5.00	8	5	3	1.01
7	10:50:45	10:52:04	0:01:19	5.00	8	7	1	1.32
8	10:53:45	10:55:07	0:01:22	5.00	8	7	1	1.37
9	10:56:00	10:57:23	0:01:23	5.00	8	7	1	1.38

*Initial Water level of 8-inches



Rate (Min/Inch): 1.38

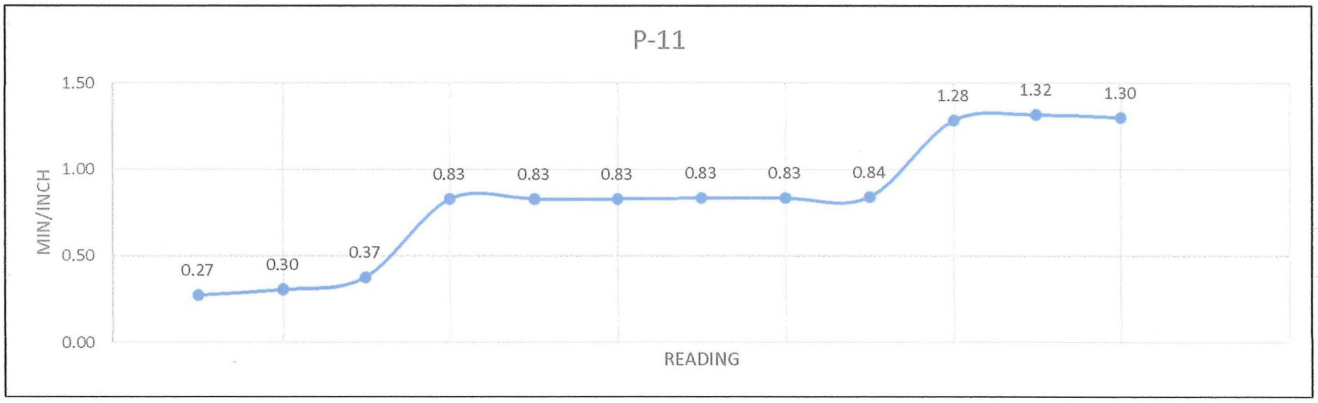
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-11
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	11:30:00	11:33:15	0:03:15	5.00	12		12	0.27
B	11:34:15	11:37:54	0:03:39	5.00	12		12	0.30
C	11:38:15	11:41:14	0:02:59	5.00	8		8	0.37

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	11:42:10	11:44:39	0:02:29	5.00	8	5	3	0.83
2	11:45:15	11:47:44	0:02:29	5.00	8	5	3	0.83
3	11:48:30	11:50:59	0:02:29	5.00	8	5	3	0.83
4	11:51:35	11:54:05	0:02:30	5.00	8	5	3	0.83
5	11:55:00	11:57:30	0:02:30	5.00	8	5	3	0.83
6	11:58:10	12:00:41	0:02:31	5.00	8	5	3	0.84
7	12:01:10	12:02:27	0:01:17	5.00	8	7	1	1.28
8	12:03:00	12:04:19	0:01:19	5.00	8	7	1	1.32
9	12:04:45	12:06:03	0:01:18	5.00	8	7	1	1.30

*Initial Water level of 8-inches



Rate (Min/Inch): 1.30

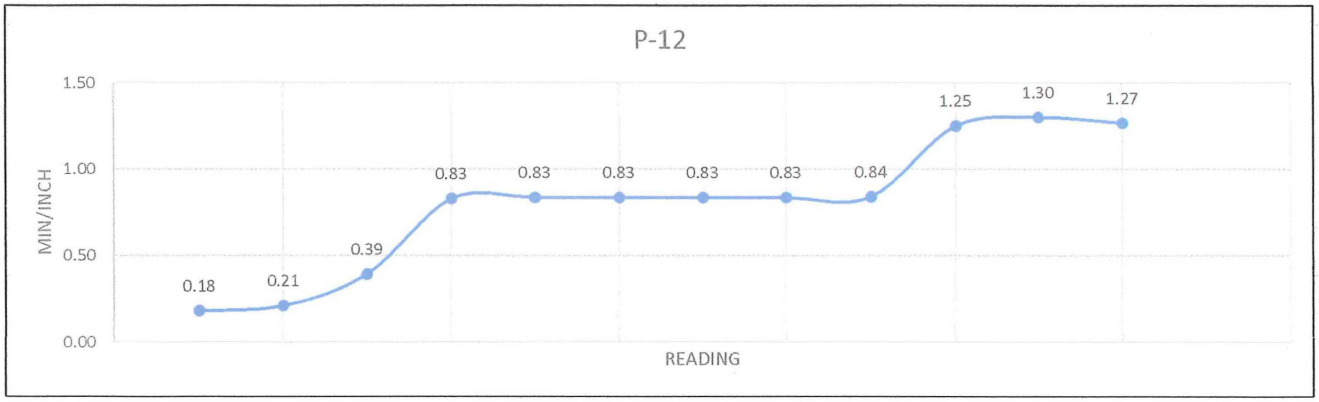
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-12
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	12:18:00	12:20:09	0:02:09	5.00	12	0	12	0.18
B	12:22:10	12:24:40	0:02:30	5.00	12	0	12	0.21
C	12:16:00	12:17:57	0:01:57	5.00	8	3	5	0.39

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	12:18:30	12:20:59	0:02:29	5.00	8	5	3	0.83
2	12:21:30	12:24:00	0:02:30	5.00	8	5	3	0.83
3	12:25:00	12:27:30	0:02:30	5.00	8	5	3	0.83
4	12:28:10	12:30:40	0:02:30	5.00	8	5	3	0.83
5	12:31:10	12:33:40	0:02:30	5.00	8	5	3	0.83
6	12:35:00	12:37:31	0:02:31	5.00	8	5	3	0.84
7	12:38:15	12:39:30	0:01:15	5.00	8	7	1	1.25
8	12:40:10	12:41:28	0:01:18	5.00	8	7	1	1.30
9	12:42:10	12:43:26	0:01:16	5.00	8	7	1	1.27

*Initial Water level of 8-inches



Rate (Min/Inch): 1.27

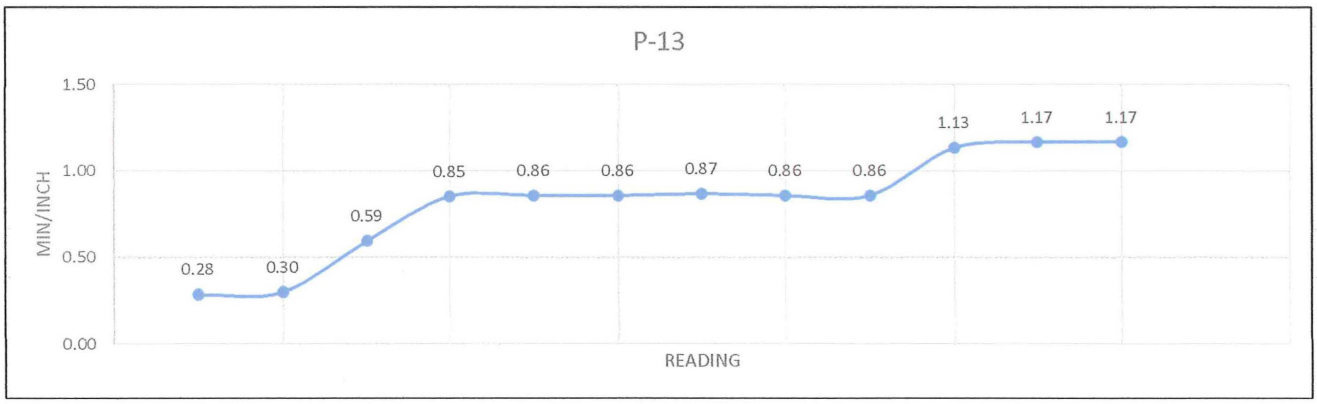
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-13
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	13:45:00	13:48:24	0:03:24	5.00	12	0	12	0.28
B	13:49:10	13:52:44	0:03:34	5.00	12	0	12	0.30
C	13:53:15	13:56:13	0:02:58	5.00	8	3	5	0.59

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	13:57:00	13:59:33	0:02:33	5.00	8	5	3	0.85
2	14:01:00	14:03:34	0:02:34	5.00	8	5	3	0.86
3	14:04:10	14:06:44	0:02:34	5.00	8	5	3	0.86
4	14:07:15	14:09:51	0:02:36	5.00	8	5	3	0.87
5	14:10:52	14:13:26	0:02:34	5.00	8	5	3	0.86
6	14:14:00	14:16:34	0:02:34	5.00	8	5	3	0.86
7	14:17:15	14:18:23	0:01:08	5.00	8	7	1	1.13
8	14:19:00	14:20:10	0:01:10	5.00	8	7	1	1.17
9	14:21:00	14:22:10	0:01:10	5.00	8	7	1	1.17

*Initial Water level of 8-inches



Rate (Min/Inch): 1.17

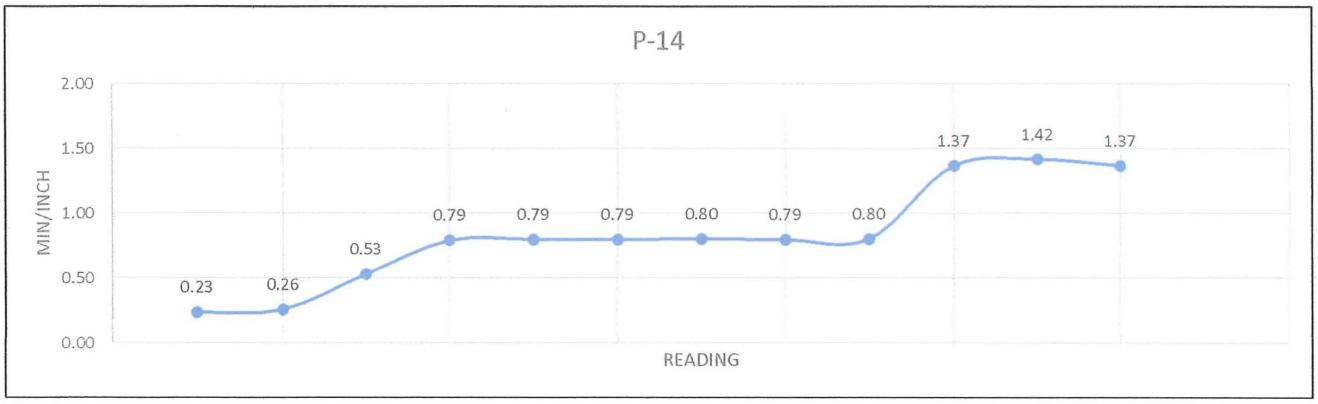
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-14
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	14:30:00	14:32:49	0:02:49	5.00	12	0	12	0.23
B	14:33:00	14:36:04	0:03:04	5.00	12	0	12	0.26
C	14:37:00	14:39:38	0:02:38	5.00	8	3	5	0.53

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	14:40:30	14:42:52	0:02:22	5.00	8	5	3	0.79
2	14:43:30	14:45:53	0:02:23	5.00	8	5	3	0.79
3	14:46:15	14:48:38	0:02:23	5.00	8	5	3	0.79
4	14:49:15	14:51:39	0:02:24	5.00	8	5	3	0.80
5	14:52:00	14:54:23	0:02:23	5.00	8	5	3	0.79
6	14:55:00	14:57:24	0:02:24	5.00	8	5	3	0.80
7	14:49:10	14:50:32	0:01:22	5.00	8	7	1	1.37
8	14:51:00	14:52:25	0:01:25	5.00	8	7	1	1.42
9	14:53:00	14:54:22	0:01:22	5.00	8	7	1	1.37

*Initial Water level of 8-inches



Rate (Min/Inch): 1.37

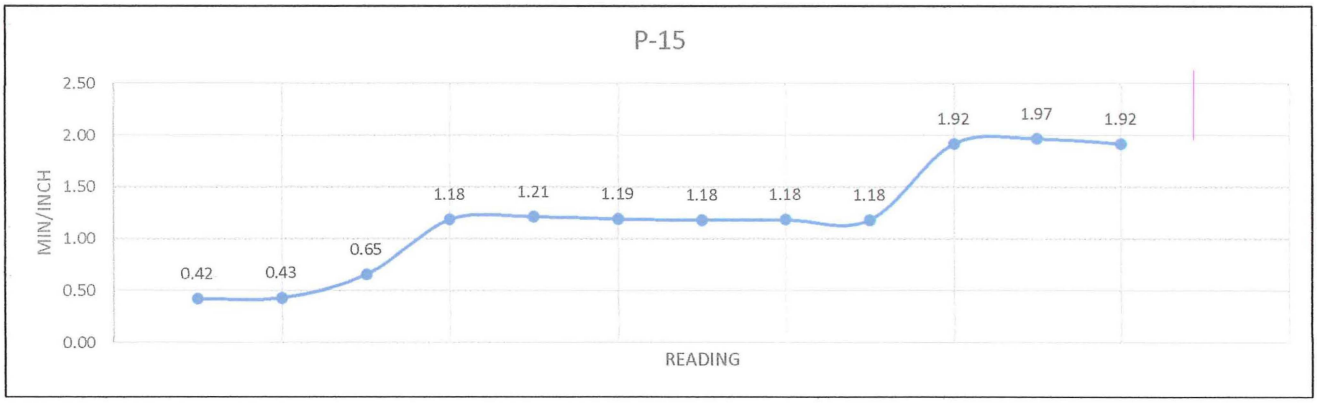
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-15
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	15:10:00	15:15:03	0:05:03	5.00	12	0	12	0.42
B	15:17:08	15:22:17	0:05:09	5.00	12	0	12	0.43
C	15:23:55	15:27:11	0:03:16	5.00	8	3	5	0.65

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	15:28:00	15:31:33	0:03:33	5.00	8	5	3	1.18
2	15:32:10	15:35:48	0:03:38	5.00	8	5	3	1.21
3	15:37:00	15:40:34	0:03:34	5.00	8	5	3	1.19
4	15:41:10	15:44:42	0:03:32	5.00	8	5	3	1.18
5	15:45:15	15:48:48	0:03:33	5.00	8	5	3	1.18
6	15:49:15	15:52:47	0:03:32	5.00	8	5	3	1.18
7	15:53:20	15:55:15	0:01:55	5.00	8	7	1	1.92
8	15:56:30	15:58:28	0:01:58	5.00	8	7	1	1.97
9	15:59:00	16:00:55	0:01:55	5.00	8	7	1	1.92

*Initial Water level of 8-inches



Rate (Min/Inch): 1.92

Sladden Engineering

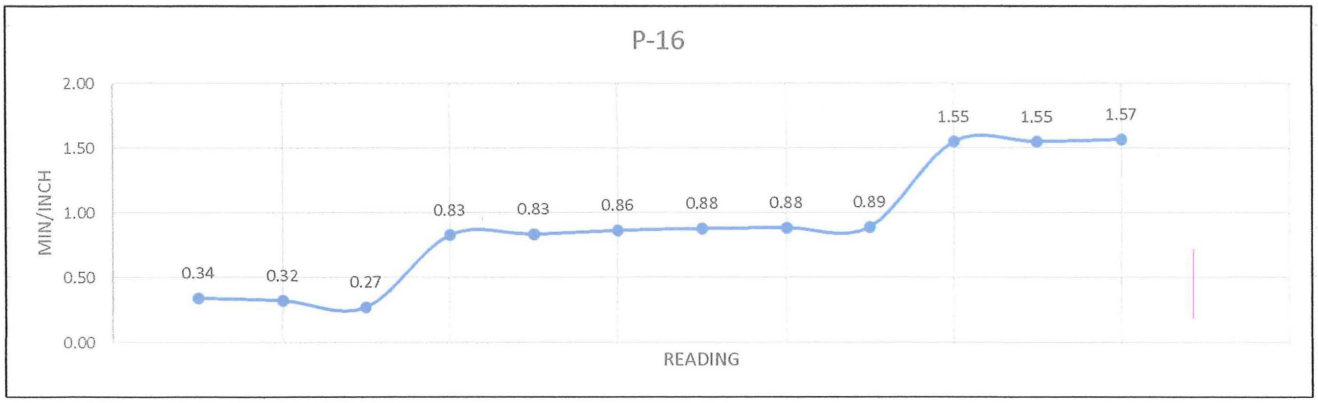
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-16
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	16:15:00	16:19:05	0:04:05	5.00	12		12	0.34
B	16:21:00	16:24:52	0:03:52	5.00	12		12	0.32
C	16:25:45	16:27:55	0:02:10	5.00	8		8	0.27

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	16:28:15	16:30:44	0:02:29	5.00	8	5	3	0.83
2	16:31:15	16:33:45	0:02:30	5.00	8	5	3	0.83
3	16:34:15	16:36:50	0:02:35	5.00	8	5	3	0.86
4	16:37:15	16:39:53	0:02:38	5.00	8	5	3	0.88
5	16:41:00	16:43:39	0:02:39	5.00	8	5	3	0.88
6	16:44:15	16:46:55	0:02:40	5.00	8	5	3	0.89
7	16:47:10	16:48:43	0:01:33	5.00	8	7	1	1.55
8	16:49:25	16:50:58	0:01:33	5.00	8	7	1	1.55
9	16:51:35	16:53:09	0:01:34	5.00	8	7	1	1.57

*Initial Water level of 8-inches



Rate (Min/Inch): 1.57

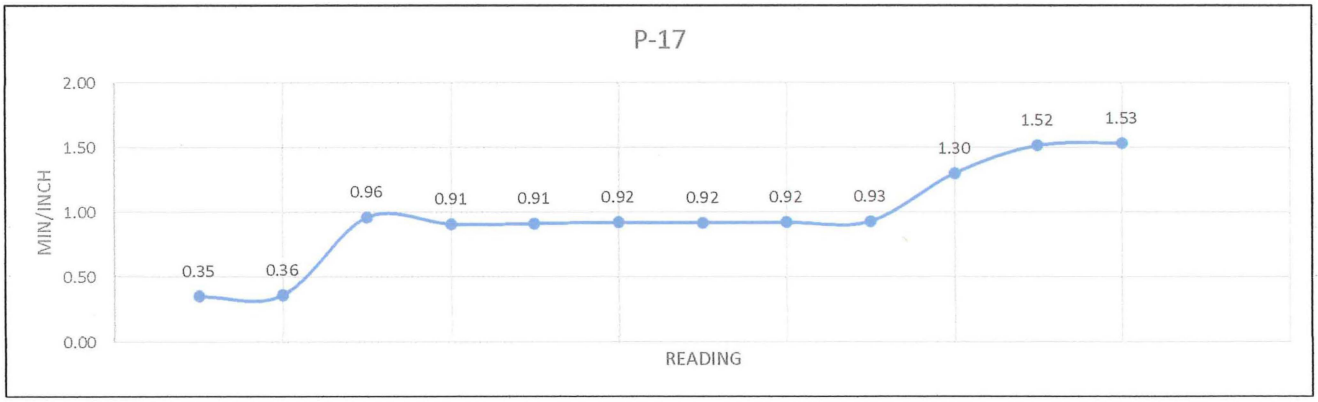
SAN BERNARDINO COUNTY LEACH LINE DATA SHEETS

Notification of Testing: 11/16/2022
Project: SEC East Broa SEC East Broadway Street and Laferney Avenue, Joshua Tree Area
Job No. : 544-22471
Date: 12/15/2022
Test Hole #: P-17
Depth (ft): 5.00
Disposal Area: Favorable
USCS Soil Class: SM/SW/SP
Tested By: E.S./S.D.

READING	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
A	17:10:00	17:14:14	0:04:14	5.00	12	0	12	0.35
B	17:15:10	17:19:29	0:04:19	5.00	12	0	12	0.36
C	17:21:30	17:26:18	0:04:48	5.00	8	3	5	0.96

READING*	START TIME	END TIME	ELAPSED TIME (h:m:s)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	Min/Inch
1	17:27:10	17:29:53	0:02:43	5.00	8	5	3	0.91
2	17:30:35	17:33:19	0:02:44	5.00	8	5	3	0.91
3	17:34:20	17:37:06	0:02:46	5.00	8	5	3	0.92
4	17:38:00	17:40:45	0:02:45	5.00	8	5	3	0.92
5	17:41:10	17:43:56	0:02:46	5.00	8	5	3	0.92
6	17:44:15	17:47:02	0:02:47	5.00	8	5	3	0.93
7	17:48:00	17:49:18	0:01:18	5.00	8	7	1	1.30
8	17:51:00	17:52:31	0:01:31	5.00	8	7	1	1.52
9	17:55:00	17:56:32	0:01:32	5.00	8	7	1	1.53

*Initial Water level of 8-inches



Rate (Min/Inch): 1.53

PERCOLATION TEST NOTIFICATION

SAN BERNARDINO COUNTY

Public Health
Environmental Health Services
PERCOLATION TEST NOTIFICATION

www.SBCounty.gov
www.sbcounty.gov/dph/dehs
Phone: (800) 442-2283

Please email form to EHS.CustomerService@dph.sbcounty.gov or fax to 909.387.4323 at least two (2) working days before testing.

THIS SECTION TO BE COMPLETED BY QUALIFIED PROFESSIONAL

QUALIFIED PROFESSIONAL INFORMATION

Firm Name			Date	
Sladden Engineering			11/16/2022	
Firm Address		**City**	**State**	**Zip**
45090 Golf Center Pkwy., Suite F		Indio	Ca	92201
Firm Contact Person	**Email(s)**		**Phone Number**	
James Minor	jminor@sladdenengineering.com		760 863-0713	

SITE INFORMATION

Owner's Name		Assessor's Parcel Number (APN)		
Four Star Realty		0605-051-01		
Site Address		**City**	**State**	**Zip**
SWC Broadway St. & Sunever Rd.		Joshua Tree	Ca	92252
Email(s)			**Phone Number**	
kim@homeparadiserg.com			626 872-2566	

BILLING INFORMATION

Environmental Health Services may need to be onsite to observe percolation testing. This will be billed at the current hourly professional rate. Provide billing information below or check one of the following:

☐ Same as Qualified Professional Information ■ Same as Site Information

Billing Name			
Billing Address	**City**	**State**	**Zip**
Email(s)		**Phone Number**	

PROJECT INFORMATION

Disposal field	■ Leach Lines	☐ Seepage Pits	☐ Alternative Treatment System	
Exploratory Boring(s)	Boring Date(s): 11/28/2022	Boring Time: 8am	Number of Borings: 15	Depth of Boring(s) in ft.: 15 ft.
Testing	Test Date(s): 11/28/2022 & 11/29/2022	Test Time: 8am	Number of Tests: 18	Depth of Test Hole(s) in ft.: 5 ft.
Project Type	■ Single Family Residence	☐ Multi Family Residential		☐ Commercial
	Lot Size (ft^2/acres)	Number of Units		Lot Size (ft^2/acres)
		Lot Size (ft^2/acres)		Estimated Flow
	Please select one of the following			
	☐ Tentative Tract (TT) # >50'		☐ Tentative Parcel Map (TPM) # >50'	
	Number of Proposed Lots	Original Lot Size (ft^2/acres) >50'	Average New Lot Size (ft^2/acres)	

A sewer connection will be required if a sewer is available within 200 ft. of the nearest property line (add 100 ft. for each additional lot). A "sewer will not serve" letter may be required prior to submittal of the percolation report.

Site Conditions	Historic groundwater level in feet >50'	Slope in disposal area (%) <30%
	Source of Water ☐ Private Well ☐ Water Purveyor	
	☐ Check box if parcel is on Forest Service Land	
	☐ Check box if lot is within 100 feet of a river/stream	

For Office Use Only

Fee:	FA Number:	Record ID:	PE Number:
Late Fee: ☐ Y ☐ N	Designated Employee:	Received By:	Date:
Check One: ☐ New ☐ Transfer ☐ Reactivate		Changes (please specify):	

PALEONTOLOGICAL ASSESSMENT FOR THE JOSHUA TREE ESTATES PROJECT

COMMUNITY OF JOSHUA TREE, SAN BERNARDINO COUNTY, CALIFORNIA

APN 0605-051-01

Prepared for:

Home Paradise Realty Group, Inc.
10392 Klingerman Street, Suite C
El Monte, California 91733

Submitted to:

County of San Bernardino
385 North Arrowhead Avenue
San Bernardino, California 92415

Prepared by:

Todd A. Wirths, M.S., P.G., Senior Paleontologist,
California Professional Geologist No. 7588
BFSA Environmental Services,
a Perennial Company
14010 Poway Road, Suite A
Poway, California 92064

May 31, 2023

BFSA Environmental Services
A Perennial Company

Paleontological Database Information

Author:	Todd A. Wirths, M.S., Senior Paleontologist, California Professional Geologist No. 7588
Consulting Firm:	BFSA Environmental Services, a Perennial Company 14010 Poway Road, Suite A Poway, California 92064 (858) 679-8218
Report Date:	May 31, 2023
Report Title:	Paleontological Assessment for the Joshua Tree Estates Project, Community of Joshua Tree, San Bernardino County, California
Prepared for:	Home Paradise Realty Group, Inc. 10392 Klingerman Street, Suite C El Monte, California 91733
Submitted to:	County of San Bernardino 385 North Arrowhead Avenue San Bernardino, California 92415
USGS Quadrangle:	Section 20, Township 1 North, Range 7 East, *Joshua Tree North, California* (7.5-minute) USGS Quadrangle
Assessor's Parcel Numbers:	0605-051-01
Study Area:	82.1 acres
Key Words*:*	Paleontological assessment; coarse Holocene and Pleistocene alluvial deposits; low to undetermined paleontological resource sensitivity; monitoring is not recommended.

Table of Contents

Section **Page**

I. INTRODUCTION AND LOCATION....1
II. REGULATORY SETTING....1
State of California....1
County of San Bernardino....4
III. GEOLOGY....4
IV. PALEONTOLOGICAL RESOURCES....6
Definition....6
Fossil Locality Record Search....6
V. PALEONTOLOGICAL SENSITIVITY....6
Overview....6
Professional Standards....7
County of San Bernardino Assessment....7
VI. CONCLUSION AND RECOMMENDATIONS....8
VII. CERTIFICATION....8
VIII. REFERENCES....8

Appendices

Appendix A – Qualifications of Key Personnel
Appendix B – Paleontological Locality Search Report

List of Figures

Figure **Page**

Figure 1 General Location Map....2
Figure 2 Project Location Map....3
Figure 3 Geologic Map....5

I. INTRODUCTION AND LOCATION

A paleontological resource assessment has been completed for the Joshua Tree Estates Project, bounded by East Broadway, Laferney Avenue, and Sunever Road, in the Joshua Tree neighborhood of unincorporated San Bernardino County, California (Figures 1 and 2). The 82.1-acre project consists of one parcel (Assessor's Parcel Number 0605-051-01) situated about two miles north of State Route 62, north of Joshua Tree National Park, in Section 20, Township 1 North, Range 7 East, of the U.S. Geological Survey (7.5-minute) *Joshua Tree North, California* quadrangle (Figure 2). The project proposes the subdivision of the property into 29 residential lots ranging in size between 2.01 and 2.36 acres, along with 11 acres dedicated for road development and improvements.

As the lead agency, the County of San Bernardino has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources. The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area; a review of the underlying geology; and recommendations to mitigate impacts to potential paleontological resources, if necessary.

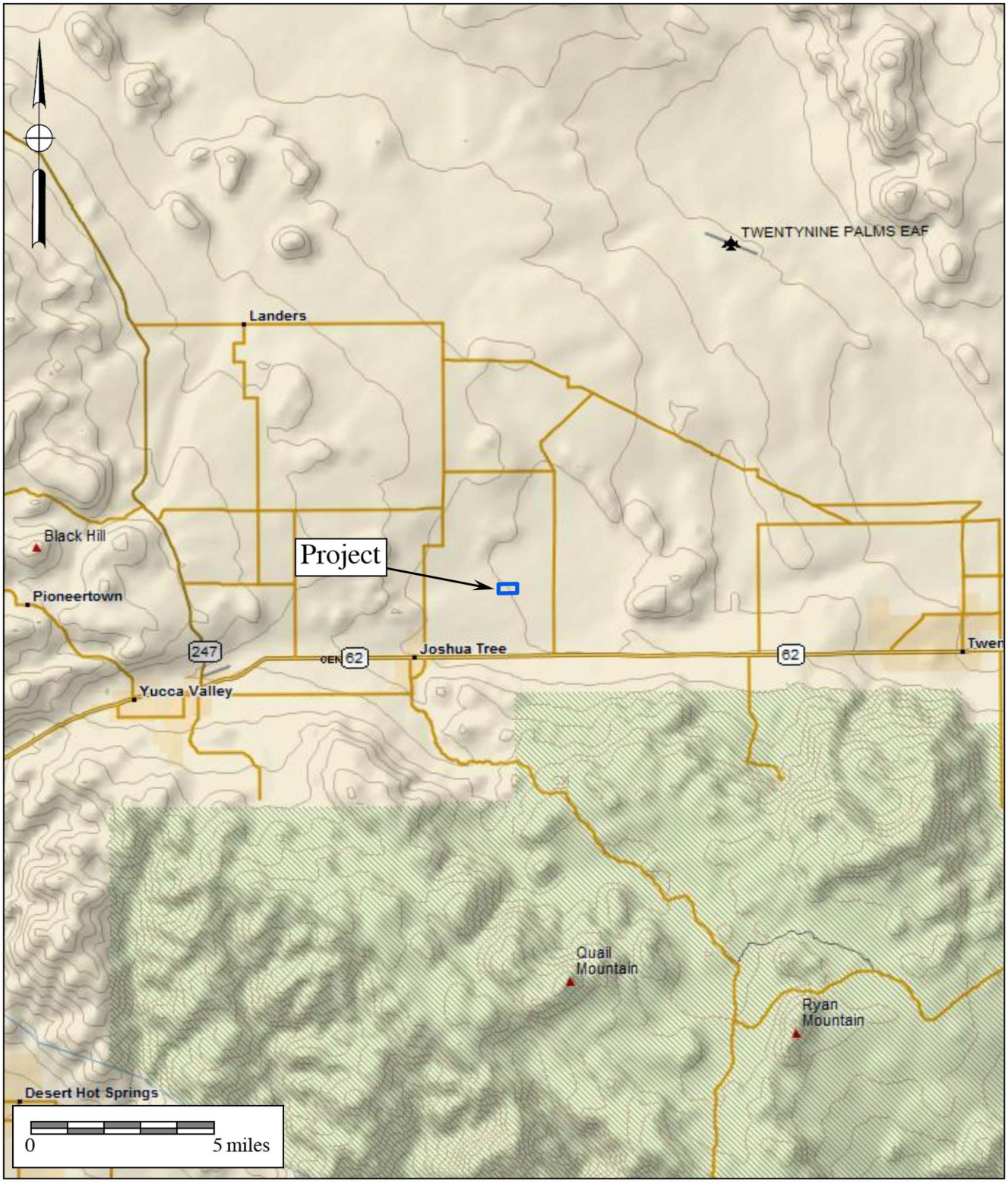
II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), which is patterned after the National Environmental Policy Act, is the overriding environmental policy that sets the requirement for protecting California's paleontological resources. CEQA mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15060 of State CEQA Guidelines provides a process by which a lead agency may review a project's potential impact to the environment, whether the impacts are significant, and provide recommendations, if necessary.

In CEQA's Environmental Checklist Form, one of the questions to answer is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law that protects nonrenewable resources including fossils, which is stated below:



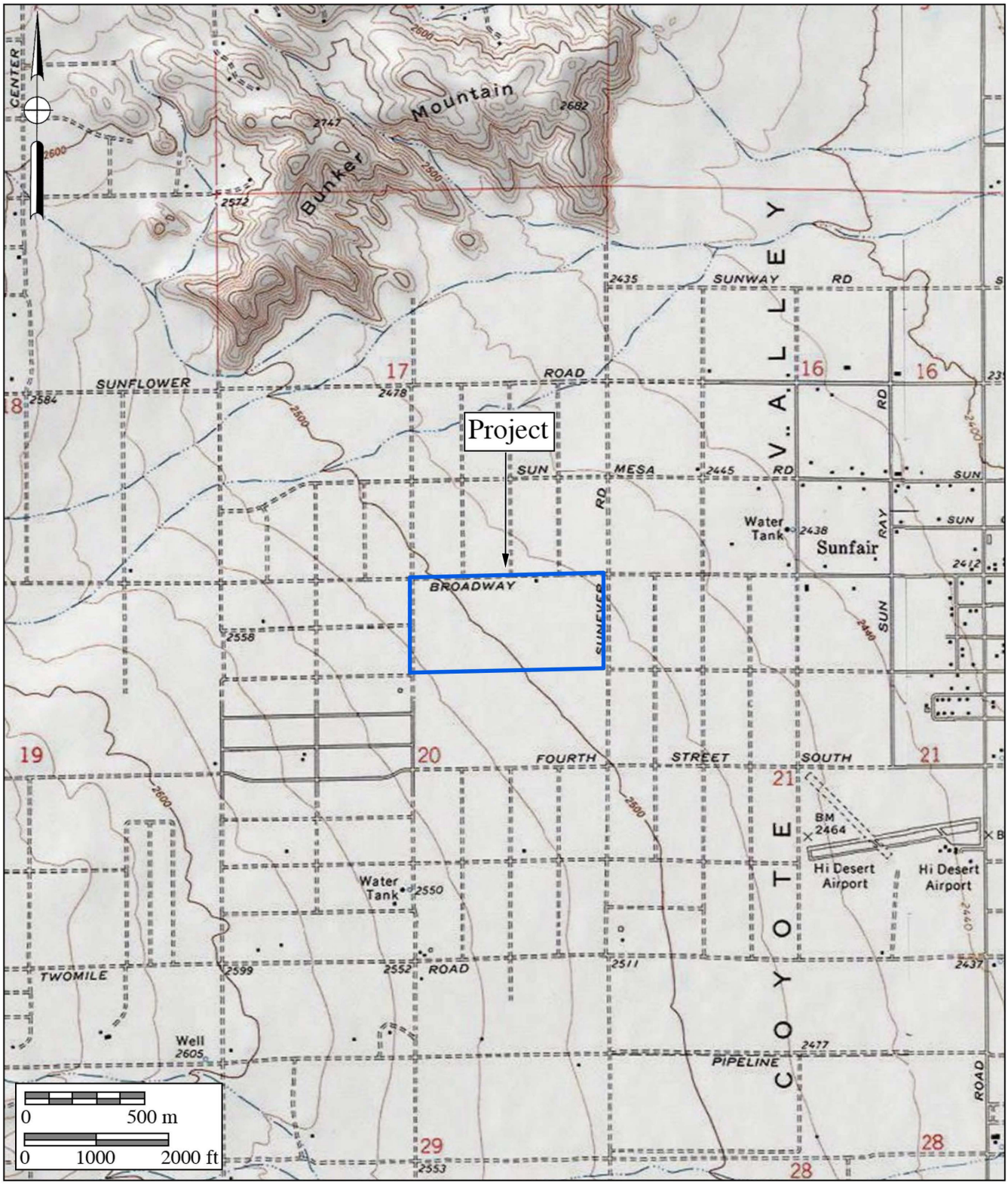
BFSA Environmental Services
A Perennial Company

Figure 1

General Location Map

The Joshua Tree Estates Project

DeLorme (1:250,000 series)



BFSA Environmental Services
A Perennial Company

Figure 2

Project Location Map

The Joshua Tree Estates Project

USGS *Joshua Tree North* Quadrangle (7.5-minute series)

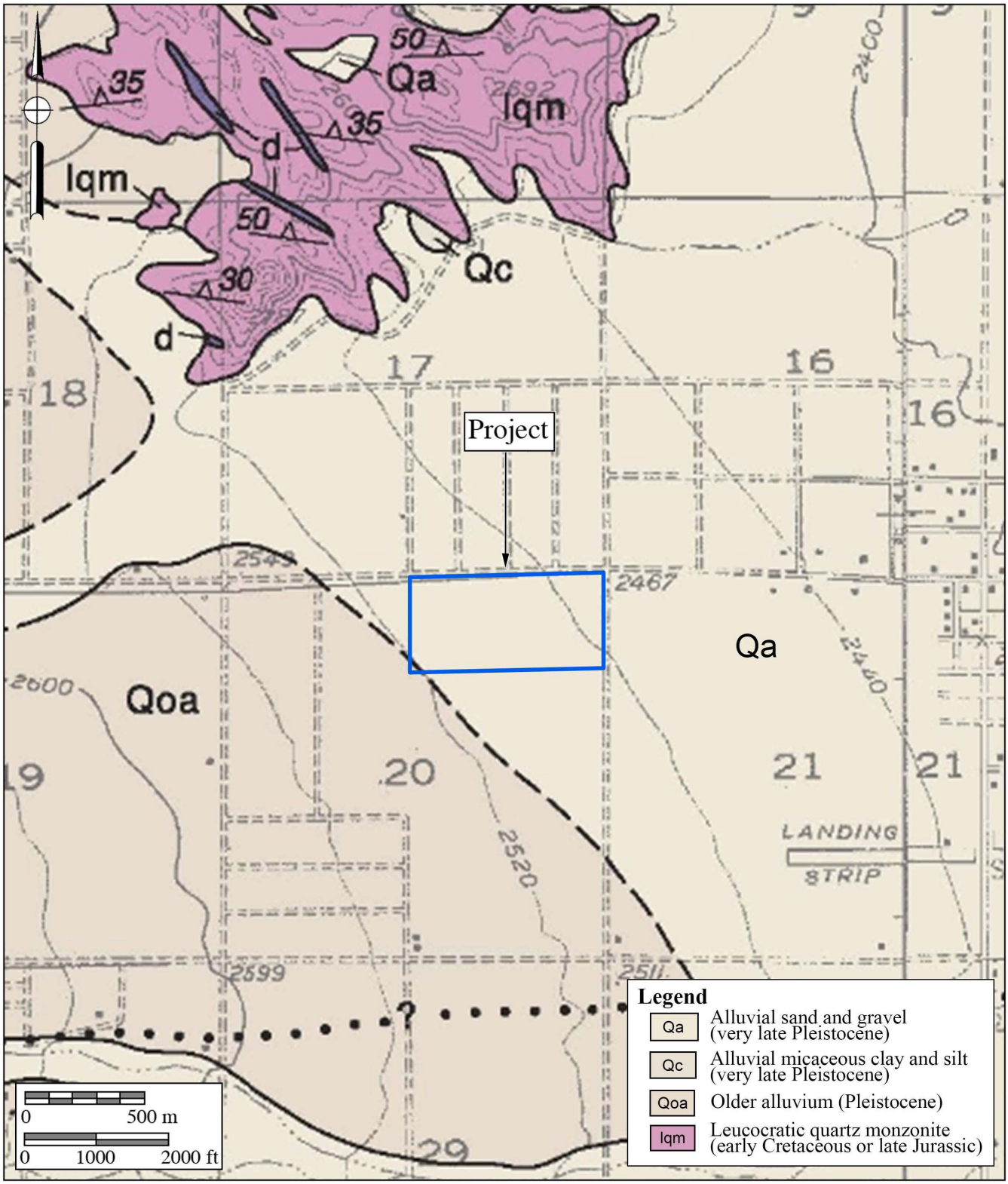
a) A person shall not knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands.
b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.
c) A violation of this section is a misdemeanor, punishable by a fine not exceeding ten thousand dollars ($10,000), or by imprisonment in a county jail not to exceed one year, or by both that fine and imprisonment.

County of San Bernardino

The County of San Bernardino 2007 Development Code has developed criteria for applying guidelines to preserve and protect nonrenewable paleontological resources (County of San Bernardino 2019). In Chapter 82.20, "Paleontologic Resources (PR) Overlay," of the Development Code, Purpose, Location Requirements, Development Standards, and Paleontologist Qualifications are described in Sections 82.20.010 through 82.20.040, respectively (County of San Bernardino 2019).

III. GEOLOGY

Regionally, the project lies within Coyote Valley, a small valley surrounded by granitic hills and small peaks, including Bunker Mountain (north of the project), the Bartlett Mountains (west), Copper Mountain (east), and the Little San Bernardino Mountains (south). Ephemeral washes divide the hills. As shown on the geologic map by Thomas Dibblee (2008), most of the project occupies Holocene-aged alluvium (area represented by the symbol "Qa" on Figure 3). The Holocene alluvium is composed of gravel, sand, silt, and clay occupying the valley within the last 11,700 years. The southwestern corner of the project is mapped as Pleistocene-aged older alluvium (area labeled "Qoa" on Figure 3), consisting of gravels and sand. The older alluvial deposits underlie the younger Holocene deposits at the project at unknown, but likely variable, depths. The age of the older alluvial deposits is estimated anywhere between 11,700 years to perhaps as much as two million years old.



BFSA Environmental Services
A Perennial Company

Figure 3

Geologic Map

The Joshua Tree Estates Project

Geology after Dibblee (2008)

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under state and local guidelines (Section II of this report).

Fossil Locality Record Search

A paleontological literature review and collections and locality records search was conducted for the project by the Division of Geological Sciences at the San Bernardino County Museum (Kottcamp 2023 [Attachment B]). The closest-known fossil locality in a similar geologic setting as the project is located 3.1 miles to the southeast, consisting of a Pleistocene-aged rodent humerus recovered from screen washing collection techniques (Kottcamp 2023). The area of the fossil locality is mapped by Dibblee (2008) as Pleistocene old alluvium.

Based on published literature (Jefferson 1986), other, more distant fossil localities occur to the east within Twentynine Palms, east of Mesquite Lake, consisting of the bones and teeth from a diverse Pleistocene megafauna from fluvial sands and gravels. In another locality north of the project, in the area of Surprise Springs, bison, horse, llama, and camel remains were discovered.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that might have become fossilized over time. Holocene alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (*i.e.,* fossils) and is thus typically assigned a low paleontological sensitivity. Pleistocene (over 11,700 years old) alluvial and alluvial fan deposits in the Mojave Desert and the Inland Empire, however, often yield important terrestrial vertebrate fossils, such as extinct mammoths, mastodons, giant ground sloths, extinct species of horse, bison, camel, saber-toothed cats, and others (Jefferson 1991). These Pleistocene sediments are thus accorded a high paleontological resource sensitivity.

Professional Standards

The Society of Vertebrate Paleontology (2010) has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *High Potential:* Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- *Undetermined Potential:* Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and that further study is needed to determine the potential of the rock unit.
- *Low Potential:* Rock units that are poorly represented by fossil specimens in institutional collections or based on a general scientific consensus that only preserve fossils in rare circumstances.
- *No Potential:* Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Using these criteria, given the young age and coarse composition of the Holocene-aged deposits at the project, the Holocene alluvium has a low paleontological resource potential (Kottcamp 2023). Based upon the lack of nearby significant fossil localities and the coarse nature of the Pleistocene-aged deposits mapped at the project, the Pleistocene deposits may be considered to have an undetermined paleontological resource potential.

County of San Bernardino Assessment

The County of San Bernardino applies its PR Overlay guideline to those areas where paleontological resources are known to occur or are likely to be present, by using fossil location criteria reported by the San Bernardino County Museum, the University of California Museum of Paleontology (Berkeley), the Los Angeles County Natural History Museum, or other institutions (County of San Bernardino 2019, Section 82.20.020). Since a low to undetermined paleontological resource sensitivity has been, and can be, applied to the geologic strata beneath the project (Society of Vertebrate Paleontology 2010), and no known significant fossil resources have been found in the area of the project (Section IV, and above), the application of the County's PR Overlay criteria (Section 82.20.030) does not appear necessary (County of San Bernardino 2019).

VI. CONCLUSIONS AND RECOMMENDATIONS

The existence of mostly young alluvial deposits rocks at the project, and the lack of any known significant fossil specimens or fossil localities from within three miles of the subject property, and the shallow earth disturbance activities typically required for this type of development support the recommendation that paleontological monitoring *not* be required at the Joshua Tree Estates Project. A paleontological resource impact mitigation program does not appear warranted.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief, and have been compiled in accordance with CEQA criteria.

PROFESSIONAL GEOLOGIST
TODD A. WIRTHS
No. 7588
STATE OF CALIFORNIA

May 31, 2023

Todd A. Wirths
Senior Paleontologist
California Professional Geologist No. 7588

Date

VIII. REFERENCES

County of San Bernardino. 2019. County of San Bernardino 2007 Development Code. Prepared for the County of San Bernardino Land Use Services Division by several consultants. Adopted March 13, 2007; effective April 12, 2007; amended May 2, 2019. Electronic document, http://www.sbcounty.gov/Uploads/lus/DevelopmentCode/DCWebsite.pdf.

Dibblee, T.W., Jr. 2008. Geologic Map of Joshua Tree and Twentynine Palms 15-minute Quadrangles, San Bernardino and Riverside Counties, California. Dibblee Geology Center Map #DF-390, Minch, J.A., ed. Santa Barbara Museum of Natural History.

Jefferson, G.T. 1986. Fossil vertebrates from the late Pleistocene sedimentary deposits in the San Bernardino and Little San Bernardino Mountains region, *in*, Kooser, M.A., and Reynolds, R.E., eds., Geology around the margins of the eastern san Bernardino Mountains. Publications of the Inland Geological Society, v. 1, Redlands, California.

Jefferson, G.T. 1991. A catalogue of late Quaternary vertebrates from California: Part two, mammals. Natural History Museum of Los Angeles County, Technical Reports, no. 7: i-v + 1-129.

Kottcamp, S. 2023. Paleontology Records Review for site of Joshua Tree Estates, Sunfair, San Bernardino County, San Bernardino County, California. Unpublished letter for BFSA Environmental Services, Poway, California, by the San Bernardino County Museum, Redlands, California. (attached)

Society of Vertebrate Paleontology. 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources; by the SVP Impact Mitigation Guidelines Revision Committee: Electronic document, https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines-1.pdf.

APPENDIX A

Qualifications of Key Personnel

Todd A. Wirths, MS, PG No. 7588

Senior Paleontologist

BFSA Environmental Services, A Perennial Company
14010 Poway Road • Suite A •
Phone: (858) 679-8218 • Fax: (858) 679-9896 • E-Mail: twirths@bfsa.perennialenv.com

Education

Master of Science, Geological Sciences, San Diego State University, California **1995**

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz **1992**

Professional Certifications

California Professional Geologist #7588, 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board member, San Diego Geological Society
San Diego Association of Geologists; past President (2012) and Vice President (2011)
South Coast Geological Society
Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County*. Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County*. Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California*. Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Imperial Landfill Expansion Project (Phase VI, Segment C-2), Imperial County, California*. Prepared for Republic Services, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Assessment for the Manitou Court Logistics Center Project, City of Jurupa Valley, Riverside County, California*. Prepared for Link Industrial. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Resource Impact Mitigation Program for the Del Oro (Tract 36852) Project, Menifee, Riverside County*. Prepared for D.R. Horton. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Assessment for the Alessandro Corporate Center Project (Planning Case PR-2020-000519), City of Riverside, Riverside County, California*. Prepared for OZI Alessandro, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2021 *Paleontological Monitoring Report for the Boardwalk Project, La Jolla, City of San Diego*. Prepared for Project Management Advisors, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

APPENDIX B

Paleontological Locality Search Report

2024 Orange Tree Lane, Redlands, California 92374 | Phone: 909.798.8608
www.SBCounty.gov

SAN BERNARDINO COUNTY

Museum
Division of Earth Science

Scott Kottkamp
Curator of Earth Science

28 March, 2023

Brian F. Smith & Associates Environmental Services
Attn: Todd Wirths
14010 Poway Road
Poway, CA 92064

PALEONTOLOGY RECORDS REVIEW for site of Joshua Tree Estates, Sunfair, San Bernardino County, California

Dear Mr. Wirths,

The Division of Earth Science of the San Bernardino County Museum (SBCM) has completed a records search for the above-named project in San Bernardino County, California. The proposed project site (Joshua Tree Estates) is in the unincorporated community of Sunfair, California as shown on the United States Geological Survey (USGS) 7.5-minute Joshua Tree North, California quadrangle.

Geologic mapping of the region done by Dibblee and Minch (2008) indicates most of the project site is situated atop Holocene age alluvial deposits (Qa), comprised of medium to coarse-grained sand and gravel. The exact composition of Qa is variable, with fine sand, silt, and clay present in smaller proportions and sometimes being the primary grain size in individual layers. Qa settles locally into the center of valleys between hills, mountains, and other highlands, flanked by older alluvium and the resistant bedrock of the surrounding terrain. Qa deposits are unlikely to be fossiliferous.

There is a small patch of older alluvium of Pleistocene age (Qoa) exposed at the surface in the southwest corner of the project site (Dibblee and Minch 2008). Furthermore, Qoa directly underlies surficial Qa across the rest of the project site at uncertain and likely variable depth. Qa can generally be expected to thin as it nears the surface contact with Qoa. Local Qoa mostly

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Leonard X. Hernandez Chief Executive Officer

consists of older fan deposits sourced from the Pinto Mountains, probably deposited between ~2.5 million to ~11,000 years ago. Qoa is variable in its precise lithology and often similar to units of Holocene age except slightly more consolidated. In the local area, Qoa is most commonly poorly-bedded to nonbedded granitic cobble-pebble gravel and sand. The source rock in the local region is primarily granitic with some gneiss. Terrestrial macro- and microfossils are commonly found in Pleistocene age alluvium throughout the southwest of North America, including much of the Mojave Desert and nearby Joshua Tree National Park (Scott et al. 2006; Harris 2014).

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no paleontological resources have been discovered within the proposed project site nor within a 1-mile radius of its perimeter. The nearest locality, SBCM 1.85.1, is approximately 3.1 miles southeast of the proposed project site. A black permineralized rodent humerus was recovered here from a washed sediment sample pertaining to the lower of two 0.46m (1.5ft) thick beds of sandy silt. The locality's broader stratigraphy consists of west-dipping tan fluvial sands and silts, often with cemented beds of peanut-like calcite concretions. A second locality, 1.85.2, occurs slightly further to the north, across the road, in similar sediments. No fossils are recorded from SBCM 1.85.2; the locality seems to only pertain to sediment samples.

This records search covers only the paleontological records of the San Bernardino County Museum. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Please do not hesitate to contact us with any further questions that you may have.

Sincerely,

Scott Kottkamp, Curator of Earth Science
Division of Earth Science
San Bernardino County Museum

Literature Cited

Dibblee, T.W., and Minch, J.A. 2008. Geologic map of the Joshua Tree & Twentynine Palms 15 minute quadrangles, Riverside & San Bernardino Counties, California. Dibblee Geological Foundation. Dibblee Foundation Map DF-390. Scale 1:62,500.
Available at: https://ngmdb.usgs.gov/Prodesc/proddesc_85245.htm (accessed 12 October 2022).

Harris, A. 2014. Pleistocene Vertebrates of Southwestern USA and Northwestern Mexico. TEP Biodiversity Collections, Department of Biological Sciences, and Centennial Museum, University of Texas at El Paso. El Paso, TX. 10.13140/2.1.3490.7527.
Available at: www.utep.edu/leb/pleistnm/ (accessed 12 October, 2022).

Scott, E., K. Springer, J.C. Sagebiel, and C.R. Manker. 2006. Planning for the Future: A Program for Preserving and Interpreting Paleontology and Geology in Joshua Tree National Park. In: S.G. Lucas et al. 2006. Fossils from Federal Lands. New Mexico Museum of Natural History and Science Bulletin 34: 159-164.

July 17, 2025

Kim Chen
Home Paradise Realty Group, Inc.
10392 Klingerman Street, Suite C
El Monte, California 91733

Subject: Update: Paleontological Assessment for the Joshua Tree Estates Project, Community of Joshua Tree, San Bernardino County, California (APN 0605-051-01)

Dear Ms. Chen:

This letter addresses potential paleontological resources that may be impacted during construction activities for the development of the Joshua Tree Estates Project. The project is bounded by East Broadway, Laferney Avenue, and Sunever Road in the Joshua Tree neighborhood of unincorporated San Bernardino County, California. The 82.1-acre project consists of one parcel (Assessor's Parcel Number 0605-051-01), situated about two miles north of State Route 62, north of Joshua Tree National Park. The project proposes subdividing the property into 32 residential lots ranging in size between 2.01 and 2.36 acres, along with 11 acres dedicated for road development and improvements.

A paleontological resources assessment report was previously drafted for the Joshua Tree Estates Project by BFSA Environmental Services, dated May 31, 2023 (Wirths 2023). The report concluded that paleontological monitoring is not recommended at the Joshua Tree Estates Project, based upon the presence of mostly young alluvial deposits at the project, the lack of any known significant fossil specimens or fossil localities within three miles of the subject property, and the shallow earth disturbance activities typically required for this type of development.

Since the issuance of that report, the paleontological resource sensitivity assessed at the project has remained the same. The conclusions and recommendations presented in the report by Wirths (2023) are still valid, provided that the scope of the development has not significantly changed since then.

If you have any questions concerning this evaluation, please feel free to contact us at our Poway address. Thank you for the opportunity to provide paleontological services for this project.

Sincerely,

Todd Wirths, M.S., P.G.
Principal Paleontologist
California Professional Geologist No. 7588

Reference

Wirths, T.A. 2023. Paleontological Assessment for the Joshua Tree Estates Project, Community of Joshua Tree, San Bernardino County, California. Consulting report prepared for Home Paradise Realty Group, Inc., El Monte, California, by BFSA Environmental Services, a Perennial Company, Poway, California.

July 31, 2025

TJW ENGINEERING, INC.
TRAFFIC ENGINEERING &
TRANSPORTATION PLANNING
CONSULTANTS

Kim Chen
J.T. SANTORI VILLA LLC.
1751 Colorado Blvd, #333
Los Angeles, CA 90041

SUBJECT: Joshua Tree Estates Tract 20668 VMT Screening, County of San Bernardina, CA

Dear Kim Chen,

TJW Engineering, Inc. (TJW) is pleased to submit this Vehicle Miles Traveled (VMT) Screening for the proposed project to be located at the southeast corner of La Ferney Avenue and East Broadway in the County of San Bernardino, California. The project proposes the construction of 32 single family dwelling units. The purpose of this memorandum is to provide a summary of the VMT Screening of the proposed project.

Proposed Project

The site for the proposed project is located at the southeast corner of La Ferney Avenue and East Broadway in the County of San Bernardino. The project proposes the construction of 32 single family dwelling units. A site plan is attached for reference.

Site access will be provided via multiple access points. The project site is bordered on the north by East Broadway, on the east by Sunever Road, on the south by Saphire Street, and on the west by La Ferney Avenue. Most dwelling units along these roadways will connect directly with them. Additionally, the project proposes three (3) new roadways parallel to La Ferney Avenue and Sunever Road, each connecting East Broadway and Saphire Street. Dwelling units constructed along the new roadways will connect with the proposed roadways.

Vehicle Miles Traveled (VMT) Screening

Senate Bill (SB) 743 was adopted in 2013 requiring the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts within the California Environmental Quality Act (CEQA). For land use projects, OPR has identified Vehicle Miles Traveled (VMT) as the new metric for transportation analysis under CEQA. The regulatory changes to the CEQA guidelines that implement SB 743 were approved on December 28th, 2018, with an implementation date of July 1st, 2020, as the new metric.

The *San Bernardino County Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (County Guidelines)* (February 2020) provide screening criteria and requirements for VMT assessment of land use projects. Step 2: Low VMT Area Screening indicates that residential projects located within a low VMT-generating area may be presumed to have a less than significant impact as long as the project is consistent with the existing land use within the traffic analysis zone (TAZ).

The parcel on which the project is proposed is designated for RL: Rural Living, or 1 dwelling unit per 2.5 acres (du/ac). Since each individual lot of the proposed project are 2.5 acres, the project is consistent with the existing land use and may screen from VMT analysis if it is found to be located within a low VMT-generating area.

To find if the project location is within a low VMT-generating area, the web-based SBCTA VMT Screening Tool was utilized. The VMT Tool found that the project will be located within an low VMT-generating area. Thus, per the *County Guidelines*, the project may be presumed to have a less than significant impact and may screen from VMT analysis. The VMT Tool results are attached for reference.

Summary

This memorandum provides an overview of the VMT screening for the proposed project. Based on the *County Guidelines*, the proposed project is located within a low VMT-generating area and is consistent with the existing land use of the area. Therefore, the project may be presumed to have a less than significant impact and may screen from VMT analysis.

Please contact us at (949) 878-3509 if you have any questions regarding this analysis.

Sincerely,

Thomas Wheat, PE, TE
President
Registered Civil Engineer *#69467*
Registered Traffic Engineer *#2565*

David Chew, PTP
Transportation Planner

Travis Yokota
Assistant Transportation Planner

JOSHUA TREE ESTATES

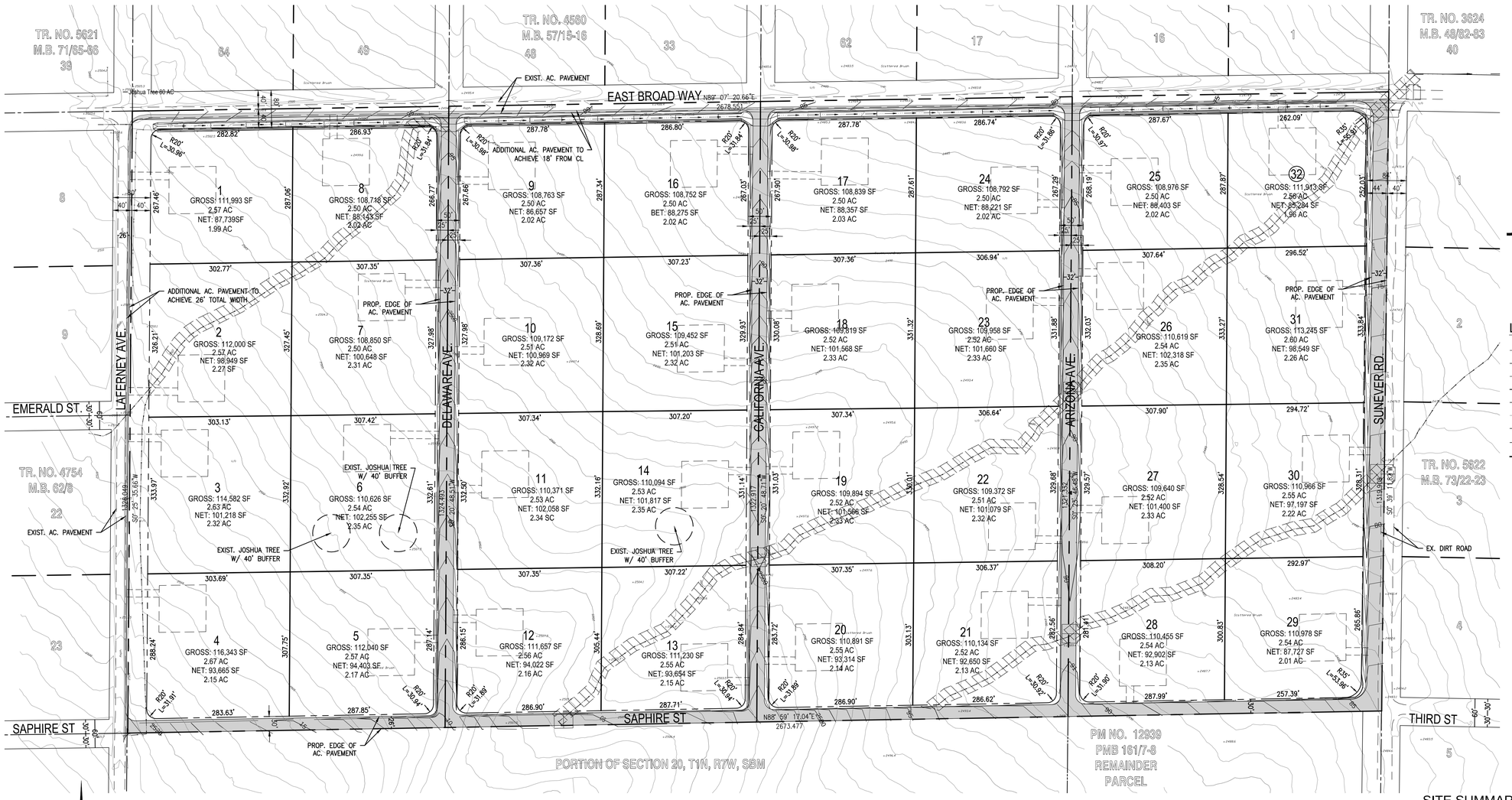
IN UNINCORPORATED TERRITORY OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

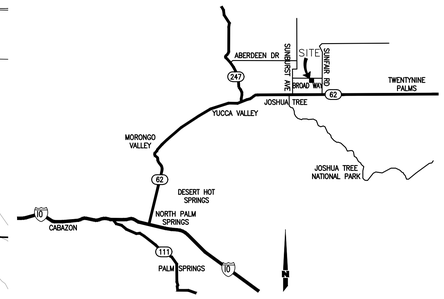
TENTATIVE TRAC.T No. 20668

BEING A PROPOSED SUBDIVISION OF THE NORTH ONE-HALF OF THE NORTHEAST ONE- QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA AC.CORDING TO THE OFFICIAL PLAT THEREOF.

JULY 2024

FOR OFFICIAL USE ONLY





VICINITY MAP

NOT TO SCALE

LEGEND

- PROJECT BOUNDARY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- STREET CENTERLINE
- 1640 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 1640 PROPOSED CONTOUR
- EXIST. FLOW LINE & DIRECTION
- PROPOSED SWALE
- 2:1 PROPOSED SLOPE W/SLOPE RATIO
- FLOW DIRECTION
- PROPOSED CHANNEL CROSSING
- 10,000 S.F. BLDG. ENVELOPE

MIN. 20' WIDE DRAINAGE EASEMENT. FINAL WIDTH TO BE DETERMINED AT TIME OF FINAL MAP & CONSTRUCTION DRAWINGS

ABBREVIATIONS

FS	FINISH SURFAC.E ELEVATION
PE	PAD ELEVATION
H.P.	HIGH POINT
L.P.	LOW POINT
H=2.5'	HEIGHT OF WALL OR D.F.
T/G	TOP OF GRATE INLET
T/S	TOP OF SLOPE
G.B.	GRADE BREAK
FL	FLOWLINE
TR	TRAC.T MAP
NO.	NUMBER
MB	MAP BOOK
PMB	PARCEL MAP BOOK
PM	PARCEL MAP
ST	STREET
BNDY	BOUNDARY
CL	CENTERLINE
HZ	HORIZONTAL
EX.	EXISTING
N'LY	NORTHERLY
S'LY	SOUTHERLY
E'LY	EASTERLY
W'LY	WESTERLY
AC.	ASPHALT CONCRETE
PROP.	PROPOSED

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBER: 0605-051-01

UTILITY PROVIDERS

ELECTRIC:
SOUTHERN CALIFORNIA EDISON COMPANY
P.O. BOX 11482
SANTA ANA, CA 92711
(714) 796-9920

WATER:
JOSHUA BASIN WATER DIST.
61750 CHOLITA RD.
JOSHUA TREE, CA 92252
(760) 336-8438

SEWER:
PRIVATE INDIVIDUAL SEPTIC

TELEPHONE:
AT&T
(800) 310-2355

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9191

TRASH SERVICES:
4878 NEWTON ROAD
YUCCA VALLEY, CA 92284
(760) 340-2113

GAS:
SOUTHERN CALIFORNIA GAS COMPANY
(800) 427-2200
DEVELOPER WILL USE PROPANE

SITE SUMMARY

SITE ACREAGE (GROSS):	81.2 AC..
R.O.W. TO BE DEDICATED:	-11.0 AC..
SITE ACREAGE (NET):	70.2 AC..
TOTAL NUMBER OF RESIDENTIAL LOTS:	32
LINEAR FEET OF NEW STREETS	6,642 LF

SITE INFORMATION

ASSESSOR'S PARCEL NUMBER: 0605-051-01

TRACT NUMBER: 20668

EXISTING ZONING: JT/RL (JOSHUA TREE/RURAL LIVING)

PROPOSED ZONING: NO CHANGE

EXISTING LAND USE: VACANT

PROPOSED LAND USE: SFR

PROJECT TYPE: DEVELOPER BUILD OUT

NOTE: ALL ADJACENT PARCELS ARE ZONED JT/RL

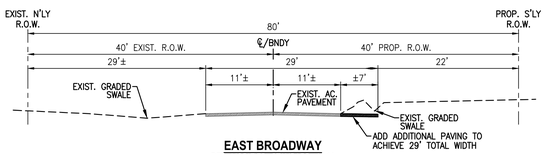
EARTHWORK

	CUT (C.Y.)	FILL (C.Y.)
RAW EARTHWORK:	14,620	7,830
OVEREX & RECOMPACT:	29,200	29,200
SUBSIDENCE (0.1"):	-(1,500)	0
SUBTOTAL:	42,320	0
SHRINKAGE (12.5%):	(5,290)	0
SURFACE ORGANICS & OTHER LOSSES	---	0
TOTAL:	37,030	37,030
NET IMPORT/EXPORT = 0 (C.Y.)	---	0

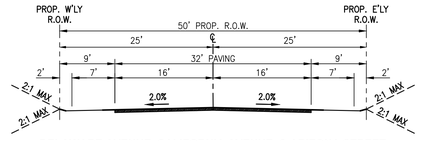
0 50 100 150 200

GRAPHIC SCALE

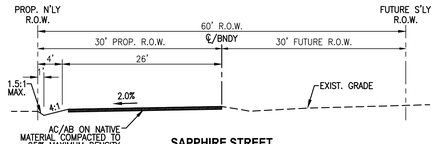
SCALE 1"=100'



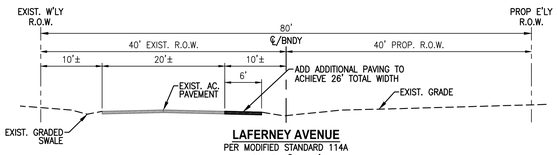
EAST BROADWAY
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



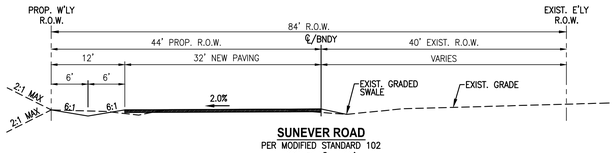
DELAWARE AVENUE, CALIFORNIA AVENUE, & ARIZONA STREET
PER MODIFIED STANDARD 104A
SCALE: 1" = 10'



SAPPHIRE STREET
PER MODIFIED STANDARD 111
SCALE: 1" = 10'



LAFERNEY AVENUE
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



SUNEVER ROAD
PER MODIFIED STANDARD 102
SCALE: 1" = 10'

ENGINEER'S STATEMENT

THIS TENTATIVE TRACT MAP WAS PREPARED UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, ALL EASEMENTS OF RECORD ARE SHOWN PER THE TITLE REPORT DATED _____BY_____TITLE COMPANY.

RICHARD DAIL REAVES, RCE 80614 DATE

DRAINAGE NOTE

CROSS-LOT DRAINAGE EXISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL AGREE TO ACCEPT RUNOFF FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED RUNOFF IS NOT ALTERED. EACH LOT OWNER SHALL AGREE NOT TO ALTER THE QUANTITY OR QUALITY OF THE RUNOFF FROM THEIR LOT ONTO THE ADJACENT PROPERTY. NO LOT GRADING WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAD GRADING, SWALES AND RUNOFF MITIGATION.

ENGINEER

ADKAN ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA 92504
CONTACT: RICHARD REAVES
PHONE: (951) 688-0241
EMAIL: RREAVES@ADKAN.COM

OWNER/APPLICANT

KIM CHEN
J.T. SANTORI VILLA LLC
1751 COLORADO BLVD., #333
LOS ANGELES, CA 90041
PHONE: (626) 673-2672
EMAIL: kim@homeparadiserg.com

Underground Service Alert
DIG BEFORE TOLL FREE
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 • Fax:(951) 688-0599

RICHARD DAIL REAVES R.C.E. 80614 DATE EXP. 03-31-27

REGISTERED PROFESSIONAL ENGINEER RICHARD DAIL REAVES NO. 80614 EXP. 03/31/27 CIVIL STATE OF CALIFORNIA

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF LAND USE SERVICES

SAN BERNARDINO COUNTY

RECOMMENDED BY:

APPROVED BY: DATE

TENTATIVE TRAC.T MAP

TRAC.T No. 20668
APN: 0605-051-01
JOSHUA TREE

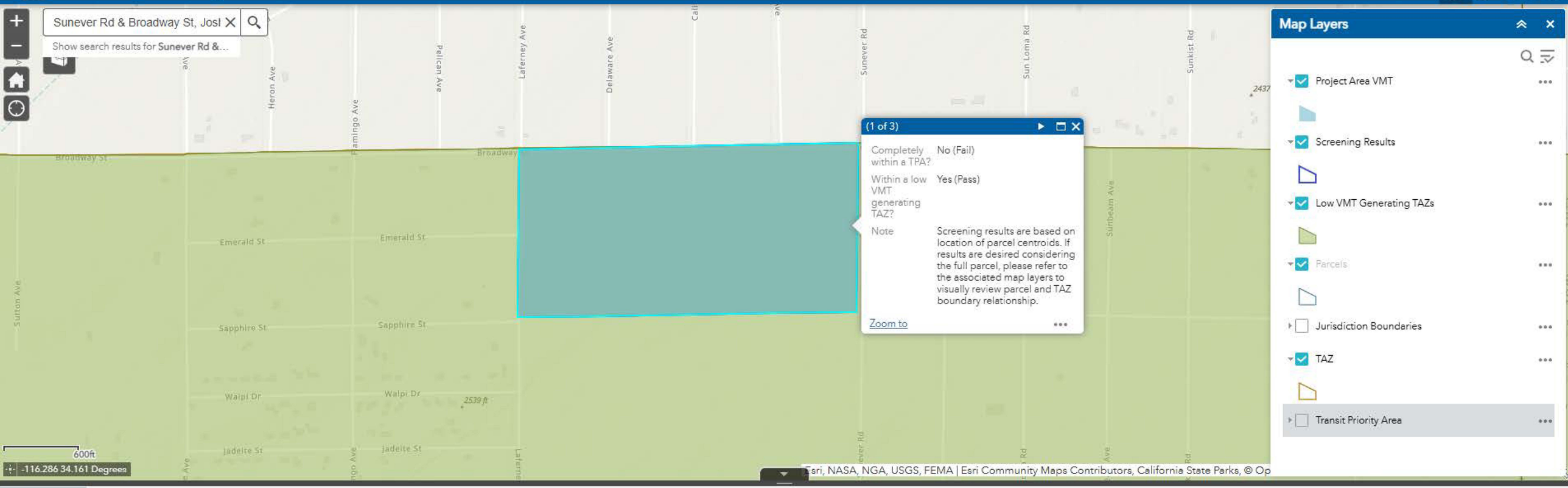
DATE PREPARED: 7/19/2024
DATE:
FILE NO.
SHEET 1 OF 1

https://sbcta-gis.sanbag.ca.gov/gisportal/apps/webappviewer/index.html?id=3cd02c669e3442e79f732be92d26d320

Google | My outlook ribbon's... | References | Maps | City Websites | Projects | Articles | TJW

SBCTA VMT Screening Tool

Powered by Fehr & Peers | User's Guide



Project Area VMT | Screening Results | Low VMT Generating TAZs | Parcels | San Bernardino County Line | Jurisdiction Boundaries

Options | Filter by map extent | Zoom to | Clear selection | Refresh

OBJECTID	Assessor Parcel Number (APN)	Traffic Analysis Zone (TAZ)	Community Region	Inside a Transit Priority Area (TPA)	TAZ VMT	Jurisdiction VMT	% Difference	VMT Metric	Threshold	Community Regions have different thresholds (1=Yes, 0=No)	Note	Shape_Length	Shape_Area
1	060505101	53,986,502.00	Unincorporated San Bernardino County	No	27.60	34.60	-20.03%	PA VMT Per Service Population	34.60	0	Screening results are based on location of parcel centroids. If results are desired considering the full parcel, please refer to the associated map layers to visually review parcel and TAZ boundary relationship.	2,943.15	479,691.06

1 features 0 selected

APPENDIX G

WILL SERVE LETTERS

JOSHUA BASIN WATER DISTRICT
Proudly providing water from an ancient source...well into the future

PO Box 675 • 61750 Chollita Road • Joshua Tree, CA 92252
Ph: (760) 366-8438 • Fax: (760) 366-9528
Website: www.jbwd.com • Email: customerservice@jbwd.com

October 24, 2023

Engineering Solutions
31600 Railroad Canyon Rd Suite J
Canyon Lake, CA 92587

Reference: **Water Service Availability Letter per submitted plot plan for Single Family Residence for APN: 0605-051-01**

Dear Engineering Solutions,

Based on the available information provided to this office, please be advised that the above referenced property is not in the wastewater service area of the Joshua Basin Water District ("District"). There is currently a water main installed and ready to serve this parcel upon payment of fees and completion of the District requirements. Water services are available for the above referenced property upon satisfaction of the conditions as described herein and pursuant to the Joshua Basin Water District ("District") Rules and Regulations for water and wastewater service. A Service Availability Letter does not constitute a permit to connect, but only identifies the conditional availability of service and the requirements that must be met in order to receive a permit to connect.

Please note that due to the Districts cross connection control requirements, this parcel may require a District approved backflow device. The installation and testing of this backflow device is solely the customer's responsibility.

This Service Availability Letter is valid for a period of **ONE YEAR** from the date of issue; information is based on a single-family residence for the referenced parcel. A zone change, subdivision or any other use will invalidate this letter. This quote is for water service for the referenced parcel only. If the referenced parcel is later subdivided, a mainline extension and/or additional meter purchase(s) may be required in order to provide water service to the new parcel(s.).

Please note that this letter and proposal to provide water service will become null and void and be of no force or effect if any of the foregoing terms and conditions are not fulfilled. All fees are subject to change.

If you have any questions, please feel free to contact us at (760) 366-8438.

Sincerely,

Sarah Johnson
General Manager

JOSHUA BASIN WATER DISTRICT
Proudly providing water from an ancient source...well into the future
PO Box 675 • 61750 Chollita Rd • Joshua Tree • California 92252
Phone: (760) 366-8438 • Fax (760) 366-9528
Website: www.jbwd.com • Email: customerservice@jbwd.com

June 8th, 2026

JT Santorini Villas LLC
1751 Colorado Blvd #333
Los Angeles, CA 90041

Subject: Initial Letter Memorandum for the JT Santorini Villas Development Project.

The Joshua Basin Water District ("District") has received a deposit for review of the proposed JT Santorini Villas Development Project ("Project") associated with Assessor Parcel Number 0605-051-01.

Based on District records, there is currently an existing District water main adjacent to the subject parcel. However, the presence of an existing water main does not constitute a commitment, reservation of capacity, or guarantee that the District can provide water service for the proposed development at the size, density, or demand levels being contemplated.

To determine whether the District has sufficient capacity and infrastructure to serve the proposed Project, the development must undergo a comprehensive plan check and technical review process. In accordance with Article 3.3 of the District's Rules and Regulations, any housing development consisting of ten (10) units or more must receive pre-approval from the District's Board of Directors before a Will Serve Letter may be issued.

As part of this review process, the District will require the submittal of supporting technical information, including water and wastewater studies prepared by a California-licensed Professional Engineer, to evaluate projected demands, infrastructure requirements, system impacts, and any necessary on-site or off-site improvements.

At a minimum, the Water Study shall address the following:

1. Water Demand Estimates

- Estimate average day, maximum day, and peak hour water demands for full buildout of the Project.
- Include fire flow requirements consistent with the standards of the local fire authority.
- Average annual demand shall be estimated at 375 gallons per day per dwelling unit.
- Maximum day and peak hour demand factors shall be 2.0 and 3.0, respectively.

2. On-Site Water Infrastructure Design

- Identify, size, and provide a conceptual layout of all proposed water distribution facilities, including pipelines, valves, hydrants, meters, service laterals, and appurtenances.
- Provide figures showing the proposed water system, connection points to the existing District system, and applicable pressure zones.
- Submit a list of proposed materials for District review and approval.
- Provide hydraulic calculations demonstrating compliance with the following criteria:
    - Minimum system pressure of 20 psi under maximum day plus fire flow conditions.
    - Maximum velocity of 10 feet per second.
    - Lateral sizing in accordance with the California Plumbing Code.
    - Meter sizing in accordance with AWWA Manual M22 and District standards.

3. Evaluation of Existing District Infrastructure

- Assess the hydraulic and operational capacity of the surrounding District water system, including transmission mains, distribution facilities, reservoirs, pressure zones, and pump stations that may be affected by Project demands.
- Evaluate available storage capacity, pressure zone performance, and distribution system capabilities.

4. Ownership and Maintenance Responsibilities

- Clearly identify facilities proposed to remain private and maintained by the Developer.
- Clearly identify facilities proposed to be dedicated to, owned, operated, and maintained by the District.
- Provide proposed exclusive easements for all District-owned facilities located on private property.

5. Wastewater Service Evaluation

- The Project shall identify the proposed method of wastewater collection, treatment, and disposal. At a minimum, the Project shall indicate whether wastewater service will be provided through individual on-site septic disposal systems, a community septic system, or a packaged wastewater treatment facility.
- If a packaged treatment facility or other centralized wastewater system is proposed, the Project shall provide a conceptual description of the system, anticipated flows, ownership and maintenance responsibilities, and any permits or approvals required from applicable regulatory agencies.
- The District reserves the right to request additional information regarding wastewater facilities as necessary to evaluate potential impacts to District facilities, operations, and service obligations.

Following staff review, the Project may be presented to the District's Board of Directors for consideration. Any determination regarding the District's ability to serve the Project shall be contingent upon successful completion of the review process, acceptance of all required studies, Board approval, execution of

necessary agreements, payment of applicable fees, and compliance with all District standards, policies, Rules and Regulations, and applicable laws.

The District reserves the right to require additional studies, analyses, easements, etc.; or other conditions deemed necessary to adequately evaluate and serve the proposed Project. Any such requirements shall be at the sole cost and expense of the Developer.

Nothing contained herein shall be construed as a commitment, reservation of capacity, vested right, guarantee of service, or approval of the proposed Project. Water service availability and capacity determinations shall be made solely upon completion of the District's review process and satisfaction of all applicable requirements and Board of Director's approval.

This correspondence is provided for informational purposes only and shall not be construed as a Will Serve Letter, reservation of capacity, guarantee of service availability, approval of the proposed development, or commitment by the District to provide service.

If you have any questions, please contact the District at (760) 366-8438.

Sincerely,

Sarah Johnson
General Manager
Joshua Basin Water District

Gmail

Kim Chen <kim@homeparadiserg.com>

Re: New form submission assigned to you: Development Request Form

Dani Paulino <dpaulino@jbwd.com>
To: "Rmrubalcaba@gmail.com" <rmrubalcaba@gmail.com>
Cc: Kim Chen <kim@homeparadiserg.com>, Ray Kolisz <Rkolisz@jbwd.com>, David Shook <dshook@jbwd.com>

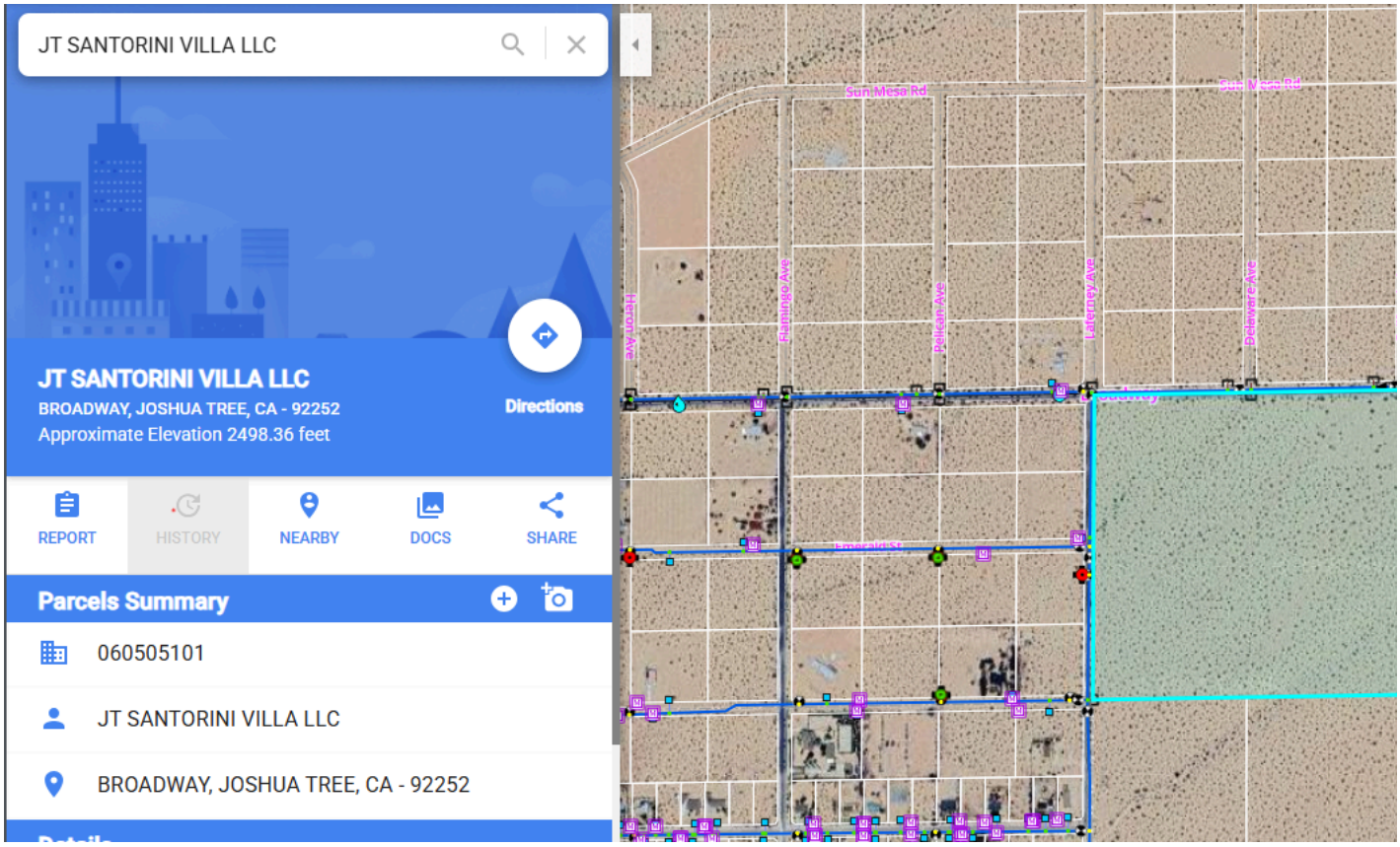
Hello Reanna,

It was nice talking with you in office today, Here is the follow up email we had discussed about.

Thank you for submitting the plans and documents. Before we can move forward with your request, the subdivision must be completed. Once the subdivision is finalized, a separate dev

After all development requests have been received, they will enter the plan check process.

Please see the map below, which confirms that water service will be available for the property once the above steps have been completed.



Dani Paulino

Compliance Coordinator

Joshua Basin Water District

61750 Chollita Road
Joshua Tree, CA 92252

760-366-8438 ext 227

JOSHUA BASIN WATER DISTRICT
Proudly providing water from an ancient source...well into the future

---

From: Rmrubalcaba@gmail.com <rmrubalcaba@gmail.com>
Sent: Monday, June 23, 2025 11:33 AM
To: Dani Paulino <dpaulino@jbwd.com>
Cc: Kim Chen <kim@homeparadiserg.com>; Ray Kolisz <Rkolisz@jbwd.com>; David Shook <dshook@jbwd.com>
Subject: Re: New form submission assigned to you: Development Request Form

Good afternoon Dani,

[Quoted text hidden]

Thank you,
Reanna ‘Ruby’ Lopez

Land Development Planning Consultant

Small Business Representative
(e) Rmrubalcaba@gmail.com

(m) 951-286-8062
(o) 951-438-7498

Disclaimer: This communication contains confidential information sent solely for the use of the intended recipient. If you are not the intended recipient of this communication, you are not authorized to use it in any

On Jun 19, 2025, at 3:17 PM, rmrubalcaba@gmail.com wrote:

Hi Dani,

Attached is the Plot Plan for Joshua Tree Estates. Please confirm if you have received everything needed for our Will Serve Review.

> Thank you,
> Reanna ‘Ruby’ Lopez
>
> Planning Consultant
>
> Land Development &
>
> Small Business Representative
> (e) Rmrubalcaba@gmail.com
> (m) 951-438-7498

On May 21, 2025, at 4:36 PM, Dani Paulino <dpaulino@jbwd.com> wrote:

Hello Reanna,

We will need the plot plans in order to move forward. This will include the plans of what is being built on the property.

Dani Paulino

Compliance Coordinator

Joshua Basin Water District

61750 Chollita Road
Joshua Tree, CA 92252

760-366-8438 ext 227

<image001.jpg>

[Quoted text hidden]

<image002.jpg>

[Quoted text hidden]

Page: Development Request Form

Development Service Request	
Applicant Name	JT Santorini Villa LLC
Applicant Phone Number	6266732672
Applicant Mailing Address; House Number & Street	1751 Colorado Blvd, #333
Mailing Address City	Los Angeles
Mailing Address State	CA
Mailing Address Zipcode	90041
Applicant Email	Kim@homeparadiserg.com
Parcel / APN Number	0605-051-01-0000
Parcel Address	63900 S Broadway St, Joshua Tree, CA 92252
Select the type of request needed for the project:	Will Serve Letter (For County Permit) Plot Plan required if you are building
What is your project type?	Residential (Single Family Residence)
What size meter(s) does your project require?	1" (One inch)
Please upload any required documentation	9f5ac74c-b0a3-4f49-b387-9fcf7533f586/10754 Tentative Tract Map-TTM - FIRE APPROVAL 3-27-26 (1).pdf
Project Information	
I understand that this form is the start of the process and that I may be asked to submit further information.	Yes, I understand.
What type of project are you proposing?	Subdivision of 32 single family residential lots with HOA
How many meters are you requesting?	1
How many structures are you proposing?	32
Any other information you would like to add:	
Hazard Assessment Questionnaire	

Is this a new meter install?	Yes
Residential Options (Check all that apply)	None of the above
Residential home based business description	32 units single family homes with HOA management
Residential "Other" description	
Commercial Options (Check all that apply)	None of the above
Commercial "Other" description	
IMPORTANT: Please allow up to ten (10) weeks for processing, due to the high volume of requests. This form will be submitted to Customer Service, who will email you the total amount due and instructions to pay online. Once payment has been made, reply to the Customer Service email with your payment confirmation number. Customer Service will reply with a confirmation that it was received and begin processing your request.	
By signing this document, I am certifying that the statements and information provided are true and accurate. I also understand that if at any time Joshua Basin Water District discovers that these statements are incorrect and that pose a health hazard, it may result in my water service being turned off.	Yes
Your Signature	Kim Chen
Please do not close the page until your document is uploaded and the application is fully submitted.	I understand

JOSHUA TREE ESTATES

IN UNINCORPORATED TERRITORY OF SAN BERNARDINO COUNTY, STATE OF CALIFORNIA

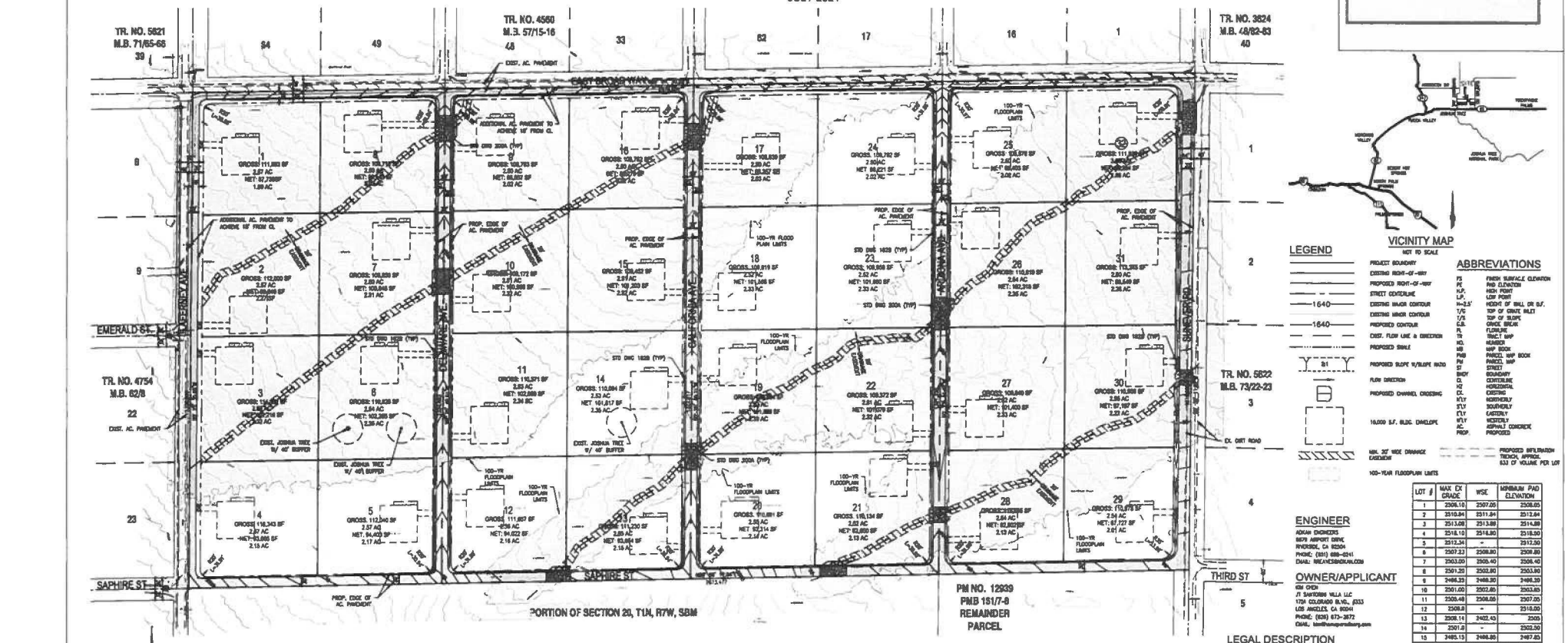
TENTATIVE TRAC.T No. 20668

BEING A PROPOSED SUBDIVISION OF THE NORTH ONE-HALF OF THE NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA AC CORDING TO THE OFFICIAL PLAT THEREOF

JULY 2024

FOR OFFICIAL USE ONLY

APPROVED WITH COMMENTS



VICINITY MAP

NOT TO SCALE

LEGEND

PROJECT BOUNDARY
EXISTING RIGHT-OF-WAY
PROPOSED RIGHT-OF-WAY
STREET CENTERLINE
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
PROPOSED CONTOUR
CONST. FLOW LINE & DIRECTION
PROPOSED SWALE
PROPOSED SLOPE W/SLOPE RATIO
FLOW DIRECTION
PROPOSED CHANNEL CROSSING
10,000 S.F. BLDG. ENVELOPE
MIN. 20' WIDE DRAINAGE EASEMENT
100-YEAR FLOODPLAIN LIMITS
PROPOSED INFILTRATION TRENCH, APPROX. 633 CF VOLUME PER LOT

ABBREVIATIONS

FS	FINISH SURFACE ELEVATION
PE	PAD ELEVATION
H.P.	HIGH POINT
L.P.	LOW POINT
H=2.5'	HEIGHT OF WALL OR S.F.
T/C	TOP OF CRATE INLET
T/S	TOP OF SLOPE
G.B.	GRADE BREAK
FL	FLOWLINE
TR	TRACT MAP
NO.	NUMBER
MB	MAP BOOK
PMB	PARCEL MAP BOOK
PM	PARCEL MAP
ST	STREET
BNDY	BOUNDARY
CL	CENTERLINE
HZ	HORIZONTAL
EX.	EXISTING
N'LY	NORTHERLY
S'LY	SOUTHERLY
E'LY	EASTERLY
W'LY	WESTERLY
AC.	ASPHALT CONCRETE
PROP.	PROPOSED

LOT #	MAX EX GRADE	WSE	MINIMUM PAD ELEVATION
1	2506.10	2507.05	2508.05
2	2510.84	2511.84	2512.84
3	2512.08	2513.88	2514.88
4	2514.10	2514.80	2515.80
5	2512.34	-	2512.50
6	2507.23	2508.80	2509.80
7	2503.00	2505.40	2506.40
8	2501.20	2502.90	2503.90
9	2486.35	2488.30	2489.30
10	2501.00	2502.65	2503.65
11	2500.48	2506.80	2507.05
12	2508.0	-	2510.00
13	2508.14	2402.45	2505
14	2501.0	-	2502.50
15	2485.13	2486.80	2487.80
16	2480.20	2482.50	2483.50
17	2488.38	2489.10	2491.10
18	2485.75	2483.80	2484.80
19	2487.80	2487.80	2488.80
20	2500.0	-	2502
21	2482.15	2483.16	2482.80
22	2482.75	2483.15	2484.15
23	2480.80	-	2482
24	2487.25	-	2488
25	2484.20	2428.40	2429.40
26	2486.80	2486.87	2487.87
27	2488.70	2489.70	2490.70
28	2489	2488.35	2490.50
29	2488.70	-	2487
30	2481.30	2483.05	2484.05
31	2479.50	2480.90	2481.90
32	2477.00	2477.75	2478.75

ENGINEER

ADKAN ENGINEERS
8570 AIRPORT DRIVE
RIVERSIDE, CA 92504
PHONE: (951) 688-4241
EMAIL: MEANES@ADKAN.COM

OWNER/APPLICANT

KIM CHEN
JT SANTORINI VILLA LLC
1754 COLORADO BLVD., #333
LOS ANGELES, CA 90041
PHONE: (626) 673-3572
EMAIL: kim@romanvillaorg.com

LEGAL DESCRIPTION

NORTH ONE-HALF OF NORTHEAST ONE-QUARTER OF SECTION 20, TOWNSHIP 1 NORTH, RANGE 7 EAST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NUMBER: 0605-051-01

UTILITY PROVIDERS

ELECTRIC:
SOUTHERN CALIFORNIA EDISON COMPANY
P.O. BOX 11493
SANTA ANA, CA 92711
(714) 796-9629

WATER:
JOSHUA BASIN WATER DIST.
61750 CHOLLA RD.
JOSHUA TREE, CA 92252
(760) 228-6430

SEWER:
PRIVATE INDIVIDUAL SEPTIC

TELEPHONE:
AT&T
(800) 310-2355

SCHOOL DISTRICT:
MORONGO UNIFIED SCHOOL DISTRICT
5715 UTAH TRAIL
TWENTYNINE PALMS, CA 92277
(760) 367-9191

WATER SERVICE:
HI-DESERT WATER DIST.
YUCCA VALLEY, CA 92284
(760) 365-3113

GAS:
SOUTHERN CALIFORNIA GAS COMPANY
(800) 427-2200
DEVELOPER WILL USE PROPANE

SITE SUMMARY

SITE ACREAGE (GROSS):	91.3 AC.
R.O.W. TO BE DEDICATED	-11.9 AC.
SITE ACREAGE (NET):	79.3 AC.
TOTAL NUMBER OF RESIDENTIAL LOTS:	32
LINEAR FEET OF NEW STREETS	6,642 LF

SITE INFORMATION

ASSESSOR'S PARCEL NUMBER: 0605-051-01
TRACT NUMBER: 20668
EXISTING ZONING: JT/RL (JOSHUA TREE/RURAL LIVING)
PROPOSED ZONING: NO CHANGE
EXISTING LAND USE: VACANT
PROPOSED LAND USE: SFR
PROJECT TYPE: DEVELOPER BUILD OUT
NOTE: ALL ADJACENT PARCELS ARE ZONED JT/RL

DRAINAGE NOTE

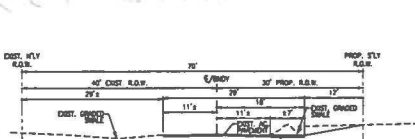
CROSS-LOT DRAINAGE EXISTS AND WILL REMAIN AFTER PUBLIC IMPROVEMENTS ARE MADE. EACH LOT OWNER WILL AGREE TO ACCEPT RUNOFF FROM THE ADJACENT PROPERTY SO LONG AS THE LOCATION OF THE FLOW OR CONCENTRATED RUNOFF IS NOT ALTERED. EACH LOT OWNER SHALL AGREE NOT TO ALTER THE QUANTITY OR QUALITY OF THE RUNOFF FROM THEIR LOT ONTO THE ADJACENT PROPERTY. NO LOT GRADING WILL OCCUR AS AN IMPROVEMENT OF THIS DEVELOPMENT. EACH LOT OWNER WILL BE RESPONSIBLE FOR THEIR OWN PAD GRADING, SWALES AND RUNOFF MITIGATION.

EARTHWORK

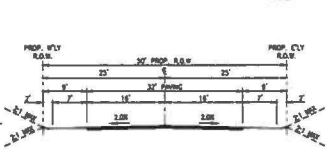
	CUT (C.Y.)	ADJUSTED CUT(+)/ FILL (-) (C.Y.)
RAW EARTHWORK:	28,183	23,539 27,364
PAVEMENT+BASE	5,736	5,736 5,736
OVER EX.	21,364	17,300 21,364
SURFACE ORGANICS & OTHER LOSSES	----	0
TOTAL:	55,183	56,627 56,627
NET EXPORT/(IMPORT) = 0 (C.Y.)	----	0

SHRINKAGE ASSUMED 15.5% (GEOTECH RECOMMENDATIONS 10/8-13/20)
SUBSIDENCE IS DEEMED NEGLIGIBLE PER GEOTECH RECOMMENDATIONS

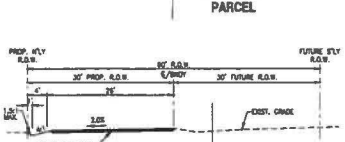
GRAPHIC SCALE
SCALE 1"=100'



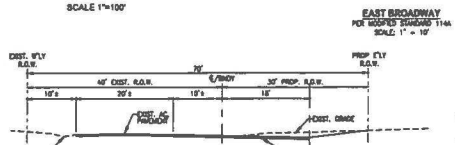
EAST BROADWAY
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



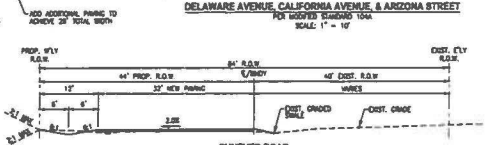
DELAWARE AVENUE, CALIFORNIA AVENUE, & ARIZONA STREET
PER MODIFIED STANDARD 104A
SCALE: 1" = 10'



SAPPHIRE STREET
PER MODIFIED STANDARD 111
SCALE: 1" = 10'



LAFERNEY AVENUE
PER MODIFIED STANDARD 114A
SCALE: 1" = 10'



SURVEYOR ROAD
PER MODIFIED STANDARD 102
SCALE: 1" = 10'

ENGINEER'S STATEMENT

THIS TENTATIVE TRACT MAP WAS PREPARED UNDER MY DIRECT SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. ALL EASEMENTS OF RECORD ARE SHOWN PER THE TITLE REPORT DATED ____ BY ____ TITLE COMPANY.

RICHARD DAIL REANES, REG. 69814 DATE

Underground Service Alert
Call: TOLL FREE
1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG.

PREPARED BY:
adkan ENGINEERS
Civil Engineering • Surveying • Planning
8570 Airport Drive, Riverside, CA 92504
Tel:(951) 688-4241 Fax:(951) 688-0999

RICHARD DAIL REANES
R.C.E. 69814
DATE
EXP. 09-31-27

MARK	REVISIONS	APPR	DATE

COUNTY OF SAN BERNARDINO
DEPARTMENT OF LAND USE SERVICES

RECOMMENDED BY

APPROVED BY

DATE

TENTATIVE TRAC.T MAP

TRAC.T No. 20668
APN: 0605-051-01
JOSHUA TREE

DATE PREPARED 7/15/2024
DATE REVISED BY ADKAN 9/30/2025
DATE 9/30/2025
FILE NO

SHEET 1 OF 1

Find Payment

Payment Details

Confirmation Number:	**2412902539**
Payment Date:	**May 12, 2026 2:36:41 PM**
Payment Amount:	**$33.00**
Processing Fee:	**$2.20**
Total Amount Charged:	**$35.20**
Payment Status:	**Accepted**
Status Description:	**Approved**
Notification Status:	**Skipped**
Email Status:	**Sent**
Application:	**Responsive OTP**
Channel:	**Web Channel**
Created By:	**CONSUMER**

Contact Information

First Name:	**Kim**
Last Name:	**Chen**
ZIP code:	**90041**
Daytime Phone Number:	**(626) 673-2672**
Email Address:	**Kim@homeparadiserg.cor**

Account Information

Payment Type:	**DEVELOPMENT/OTHER**
Account Number:	**64-99000-000**
Parcel #/apn Enter A 13-digit Number Ending In Four Zeros.	**0605051010000**
Suspended:	**No**
Payment Method:	**E-Check**
Date Due:	**May 20, 2026**

Payment Method Information

Account Type:	**Checking Account**
Account Holder Name:	**JT Santorini Villa LLC**
Account Number:	*******7834**
Routing Number:	*******3950**
Bank Name:	**Cathay Bank**

JOSHUA BASIN WATER DISTRICT
A Non-Profit Government Agency
61750 CHOLLITA RD., JOSHUA TREE, CA 92252

DATE : 5/18/2026 9:58 AM
OPER : HR
TKBY : Hillary Rogers
TERM : 23
REC# : R00517570

D-12 WILL SERVE LETTER FEE (D-12) 33.00
KIM CHEN 0605-051-01 33.00

MT 33.00 REF:2412902539

APPLIED 33.00
TENDERED 33.00

CHANGE 0.00

Cardmember acknowledges receipt of goods and/or services in the amount of the total shown hereon and agrees to perform the obligations set forth by the cardmember's agreement with the user.

X_____

Back | Resend E-mail

JT Santorini Villas - Project C26001 - 63900 BROADWAY - Initial Letter

Final Audit Report 2026-06-09

Created:	2026-06-08
By:	Hillary Rogers (hrogers@jbwd.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAA_b4KNHMTN6Hn4Sto4rLKsc_rIF5rHBQY

"JT Santorini Villas - Project C26001 - 63900 BROADWAY - Initial Letter" History

Document created by Hillary Rogers (hrogers@jbwd.com)
2026-06-08 - 9:55:43 PM GMT

Document emailed to Sarah Johnson (sjohnson@jbwd.com) for signature
2026-06-08 - 9:55:47 PM GMT

Email viewed by Sarah Johnson (sjohnson@jbwd.com)
2026-06-09 - 3:05:17 PM GMT

Document e-signed by Sarah Johnson (sjohnson@jbwd.com)
Signature Date: 2026-06-09 - 3:06:10 PM GMT - Time Source: server - Signature Appearance Selected: IMAGE

Agreement completed.
2026-06-09 - 3:06:10 PM GMT

PROPERTY INFORMATION FOR ADEQUATE SERVICE CERTIFICATION (FORM A)

APPLICANT COMPLETES THE FOLLOWING INFORMATION FOR SUBJECT PROPERTY:

Applicant Name: Kim Chen - JT Santorini Villa LLC

Mailing Address: 1751 Colorado Blvd. #333 Los Angeles, Ca 90041

Phone Number: (626) 673-2672 **Email:** kim@homeparadiserg.com

Proposed Use/Project: Joshua Tree Estates PROJ-2023-00129

Tentative Tract/Parcel Number: TTM 20668

Assessor's Parcel Number(s): 0605-051-01

Property Address: To be determined by San Bernardino County Planning Dept

Community: Joshua Tree

Property Legal:

Tract #: _____ Lot #: _____ Block #: _____

Adequate Service Certification

On-Site Sewage Disposal (Form S2)

(FOR DEHS TO COMPLETE)

Applicant Name: Kim Chen - JT Santorini Villa LLC **APN(s):** 0605-051-01

The County Department of Public Health, Division of Environmental Health Services finds that:

☐ The subject property is in an area for which the department has sufficient information to assign sewage disposal design rate in compliance with the percolation report waiver criteria.

☐ The subject property has a percolation report which has EHS approval. The report contains sufficient information for the design of an on-site disposal system for the proposed use of the property.

☑ The subject property is required to have a percolation report for EHS review and approval.

☑ Existing septic system shall be certified by a qualified professional (P.E., C.E.G., REHS, C-42 contractor) that the system functions properly, meets code, and has the capacity required for the proposed project.

Signature – DEHS

8/7/2025
DATE

Joseph Contreras
Printed Name – DEHS

July 22, 2025

JT Santorini Villa LLC.

Attn: Kim Chen (626) 872-2566

Care of: Reanna Ruby Lopez, RRuby Consulting

Location: Parcel: 0605-051-01- E Broadway & La Ferney Ave, Joshua Tree, CA 92252

The land for the above-mentioned addresses is in the Frontier Communications serving area. In accordance with California PUC Rules and Tariffs, Frontier's current plan for this project is to provide telephone, video and data services.

This commitment however is contingent upon the owner/developer fulfilling the terms and conditions of our tariff rule schedules. Such requirements include but are not limited to Rule Number 27 on file with the State of California Public Utilities Commission.

Please accept this letter as "Frontier's Intention to Serve" your project.

If you have any questions or if I may assist you in any manner, please contact me at 909.488.8405.

Very truly yours,

Aaron Dean
Engineer III, Network Engineering
Aaron.e.dean@ftr.com | 909-488-8405 | Redlands, CA
FRONTIER

www.frontier.com

Joshua Tree Estates – TTM 20668

Noise Impact Study

San Bernardino County, CA

Prepared for:

Kim Chen
J.T. Santori Villa LLC
1751 Colorado Blvd., #333
Los Angeles, CA 90041

Prepared by:

MD Acoustics, LLC
Bethany Wu, INCE-USA
Claire Pincock, INCE-USA
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065

Date: 12/2/2025

TABLE OF CONTENTS

1.0 Introduction 4
1.1 Purpose of Analysis and Study Objectives 4
1.2 Site Location and Study Area 4
1.3 Proposed Project Description 4

2.0 Fundamentals of Noise 3
2.1 Sound, Noise, and Acoustics 3
2.2 Frequency and Hertz 3
2.3 Sound Pressure Levels and Decibels 3
2.4 Addition of Decibels 3
2.5 Human Response to Changes in Noise Levels 4
2.6 Noise Descriptors 4
2.7 Traffic Noise Prediction 5
2.8 Sound Propagation 6

3.0 Ground-Borne Vibration Fundamentals 7
3.1 Vibration Descriptors 7
3.2 Vibration Perception 7
3.3 Vibration Perception 7

4.0 Regulatory Setting..... 9
4.1 Federal Regulations 9
4.2 State Regulations 9
4.3 San Bernardino County Noise Regulations 11

5.0 Study Method and Procedure..... 16
5.1 Noise Measurement Procedure and Criteria 16
5.2 Noise Measurement Locations 16
5.3 Traffic Noise Impact 16
5.4 FHWA Roadway Construction Noise Model 17
5.5 Stationary Noise Modeling 17

6.0 Existing Noise Environment 19
6.1 Short-Term Noise Measurement Results 19

7.0 Future Noise Environment Impacts and Mitigation 20
7.1 Future Exterior Noise 20
7.1.1 Noise Impacts to Off-Site Receptors Due to Stationary Sources 20

8.0 Construction Noise Impact 21
8.1 Construction Noise 21
8.2 Construction Vibration 22
8.3 Construction Noise Reduction Policies 24

9.0 References 25

LIST OF APPENDICES

Appendix A: Photographs Field Measurement Data 1
Appendix B: Construction Noise Modeling Output 2
Appendix C: HVAC Reference 3

LIST OF EXHIBITS

Exhibit A: Location Map 1
Exhibit B: Site Plan 2
Exhibit C: Typical A-Weighted Noise Levels 3
Exhibit D: Land Use Compatibility Guidelines 10
Exhibit E: Measurement Locations 18

LIST OF TABLES

Table 1: Change in Loudness 4
Table 2: Short-Term Noise Measurement Data (dBA)[1] 19
Table 3: Typical Construction Noise Levels[1] 21
Table 4: Construction Noise Levels 22
Table 5: Guideline Vibration Damage Potential Threshold Criteria 23
Table 6: Vibration Source Levels for Construction Equipment[1] 23

1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This noise assessment was prepared to evaluate the potential noise impacts for the project study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set forth by the Federal, State and Local agencies. Consistent with the County's Noise Guidelines, the project must demonstrate compliance to the applicable noise criterion as outlined within the County's Noise Element and Code.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An analysis of traffic noise impacts to and from the project site
- An analysis of construction noise impacts

1.2 Site Location and Study Area

The project site is located at the southeast corner of E Broadway and La Ferney Avenue (APN: 0605-051-01) in Joshua Tree, an unincorporated territory within San Bernardino County, CA, as shown in Exhibit A. The site is currently zoned as Joshua Tree Rural Living (JT/RL) and is surrounded by JT/RL uses in all cardinal directions. E Broadway is to the north, Sunever Road is to the east, and La Ferney Avenue is to the west.

1.3 Proposed Project Description

The project proposes the development of 32 residential lots on approximately 81.2 acres. As a worst-case scenario, this assessment assumes the project is built out in one (1) complete phase. Construction activities within the project area will consist of on-site preparation, grading, building, paving, and architectural coating.

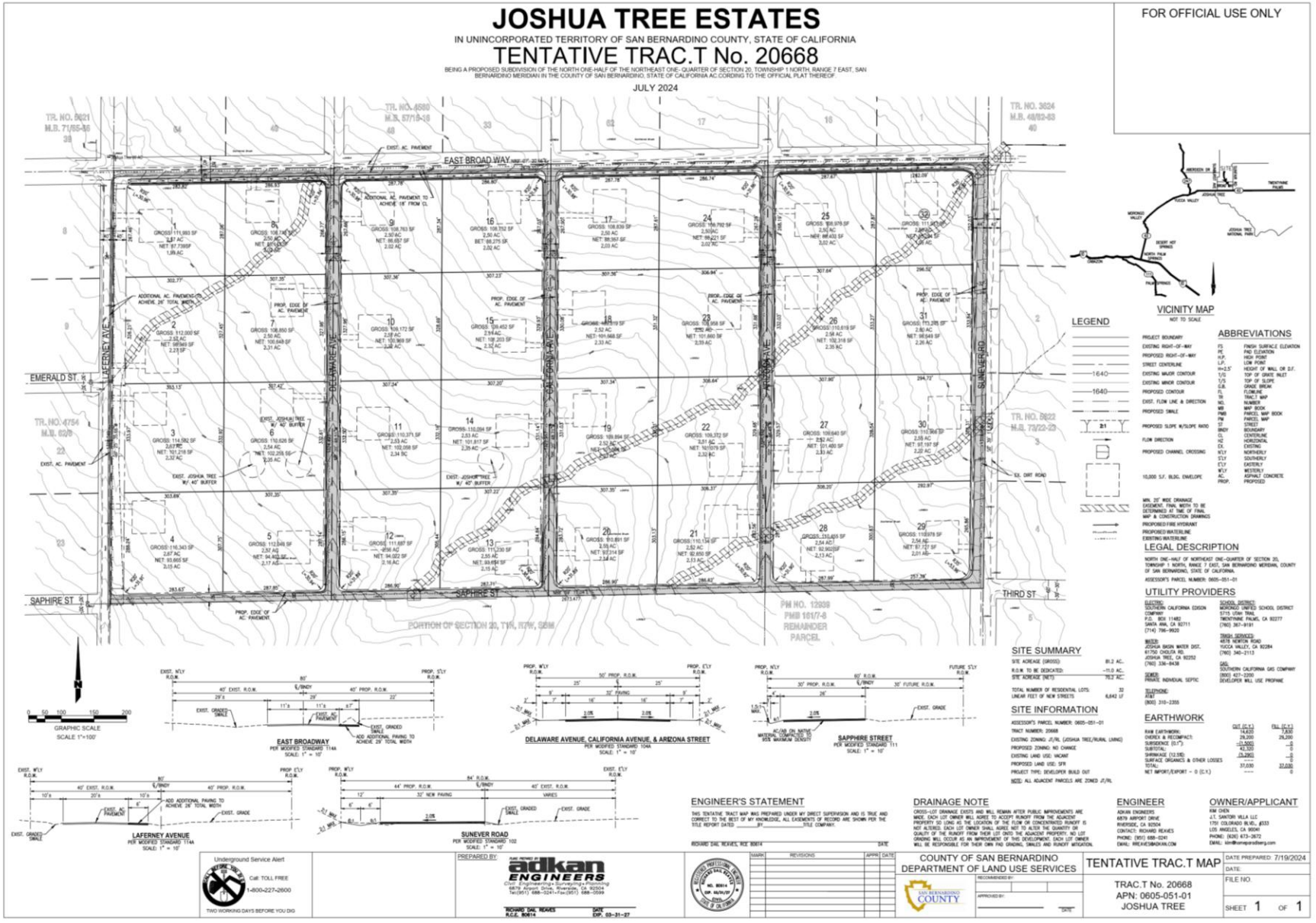
This study assesses both the traffic and short-term stationary noise to and from the project site and compares the results to the applicable County noise limits. The primary source of traffic noise propagates from E Broadway. The site plan used for this report is illustrated in Exhibit B.

Exhibit A

Location Map

Exhibit B

Site Plan



2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

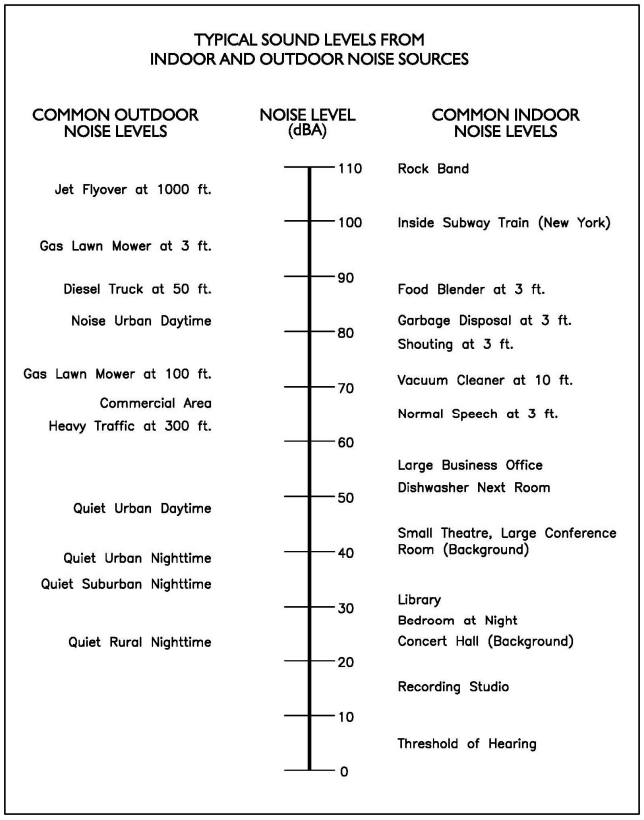
2.1 Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as the mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding), and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting at 20 Hz all the way to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels, abbreviated dB. Exhibit C illustrates reference sound levels for different noise sources.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz (on the A-weighted scale), perceiving a sound within that range as being more intense than one with a higher or lower frequency of the same magnitude. For purposes of this report, as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive a change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

Table 1: Change in Loudness

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly L50, L90 and L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

2.7 Traffic Noise Prediction

Noise levels associated with traffic depend on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2 axle), and heavy truck percentage (3 axle and greater), and sound propagation. The greater the volume of traffic, the higher the speeds, and the truck percentages

equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

2.8 Sound Propagation

As sound propagates from a source, it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading, versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt, or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located at least 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact how far sound can travel.

3.0 Ground-Borne Vibration Fundamentals

3.1 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room, and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV), which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

3.3 Vibration Perception

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic manner, and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil, but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

The proposed project is located in Joshua Tree which is an unincorporated territory within San Bernardino County, California and noise regulations are addressed through the efforts of various federal, state and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated, leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible for regulating noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible for regulating noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

The federal government advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the city is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

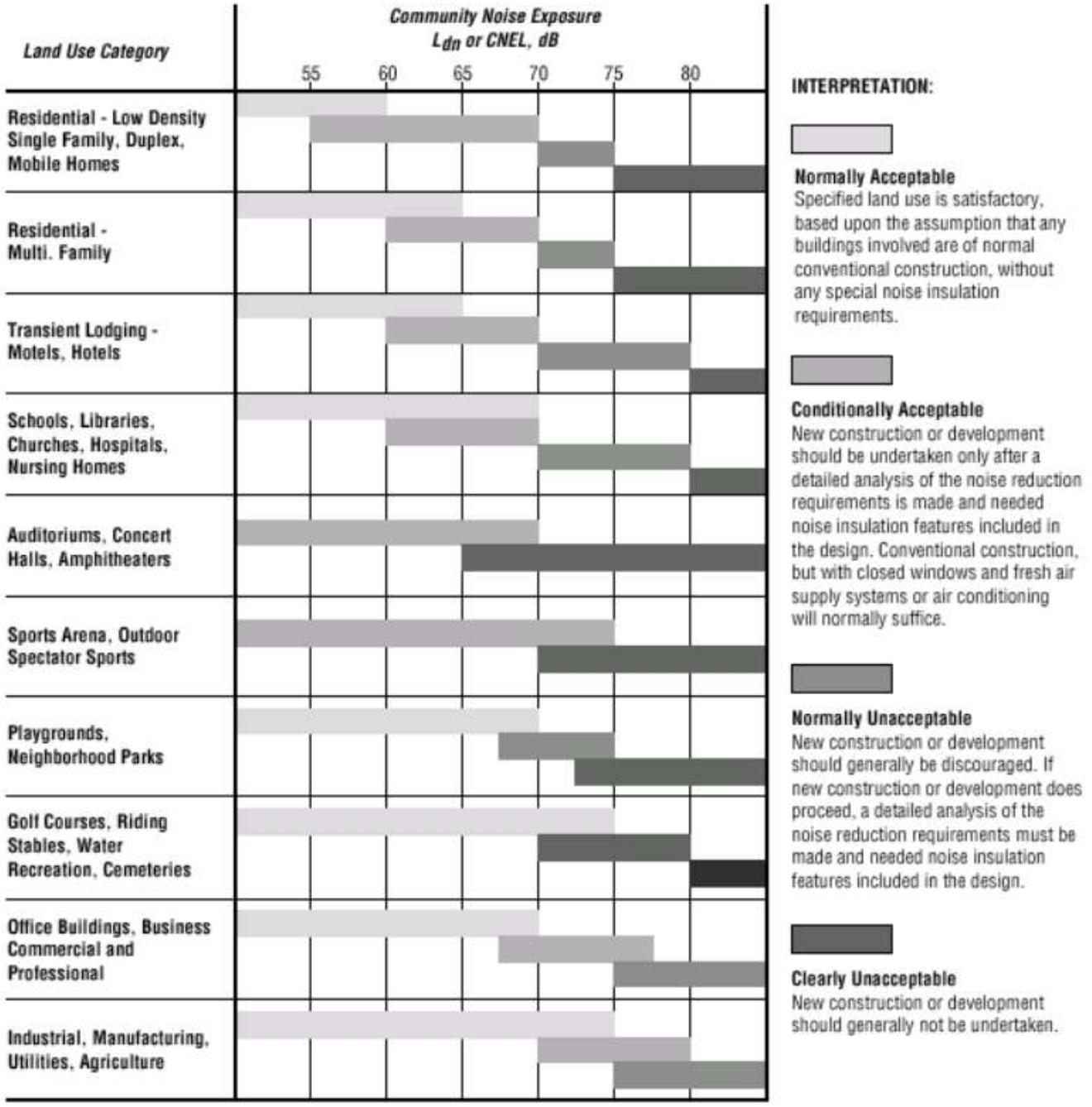
4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regulatory tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix.” The matrix allows the local jurisdiction to clearly delineate the compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the California Building Code (CBC), which, in some cases, requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State

mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable, as illustrated in Exhibit D. The County has not adopted a version of these guidelines.

Exhibit D: Land Use Compatibility Guidelines



4.3 San Bernardino County Noise Regulations

The San Bernardino County outlines their noise regulations and standards within the Policy Plan, Safety and Security Section, Hazards Element from the General Plan and the Noise Ordinance from the Development Code.

San Bernardino County Countywide General Plan

Applicable policies and standards governing environmental noise in the County are set forth in the General Plan Policy Plan. Section Safety and Security, in its goal HZ-2 Human-generated Hazards, outlines the noise policies within the county.

The County has outlined goals, policies, and implementation measures to reduce potential noise impacts and are presented below:

Goals, Policies, and Implementation Measures

Policies, goals and implementation program measures from the Policy Plan that would mitigate potential impacts on noise include the following.

Goal HZ-2 Human-generated Hazards: People and the natural environment protected from exposure to hazardous materials, excessive noise, and other human-generated hazards.

Policy HZ-2.6: Coordination with transportation authorities. We collaborate with airport owners, FAA, Caltrans, SBCTA, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, updates to transportation related plans and projects to minimize noise impacts and provide appropriate mitigation measures

Policy HZ-2.7: Truck delivery areas. We encourage truck delivery areas to be located away from residential properties and require associated noise impacts to be mitigated.

Policy HZ-2.8: Proximity to noise generating uses. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.

Policy HZ-2.9: Control sound at the source. We prioritize noise mitigation measures that control sound at the source before buffers, soundwalls, and other perimeter measures.

Policy HZ-2.10: Agricultural operations. We require new development adjacent to existing conforming agricultural operations to provide adequate buffers to reduce the exposure of new development to operational noise, odor, and the storage or application of pesticides or other hazardous materials.

San Bernardino County– Noise Ordinance/Development Code

Chapter 83.01 General Performance Standards of the County's Development Code outlines the County's noise ordinance.

Section 83.01.080 –Noise

This Section establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses.

(a) *Noise Measurement*. Noise shall be measured:
  (1) At the property line of the nearest site that is occupied by, and/or zoned or designated to allow the development of noise-sensitive land uses;
  (2) With a sound level meter that meets the standards of the American National Standards Institute (ANSI § SI4 1979, Type 1 or Type 2);
  (3) Using the "A" weighted sound pressure level scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

(b) *Noise Impacted Areas*. Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subdivision (d) (Noise Standards for Stationary Noise Sources) and Subdivision (e) (Noise Standards for Adjacent Mobile Noise Sources), below. New development of residential or other noise-sensitive land uses shall not be allowed in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to these standards. Noise-sensitive land uses shall include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

(c) *Noise Standards for Stationary Noise Sources*.

  (1) *Noise Standards*. Table 83-2 (Noise Standards for Stationary Noise Sources) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties:

Table 83-2
Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	***7:00 a.m. – 10 p.m. Leq***	***10:00 p.m. – 7 a.m. Leq***
Residential	55 dB(A)	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)

Notes:
(1) Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours.
(2) dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

(2) Noise Limit Categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(a) The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.

(b) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

(c) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.

(d) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

(e) The noise standard plus 20 dB(A) for any period of time.

(d) Noise Standards for Adjacent Mobile Noise Sources. Noise from mobile sources may affect adjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 83-3 (Noise Standards for Adjacent Mobile Noise Sources).

Table 83-3
Noise Standards for Adjacent Mobile Noise Sources

Land Use		***Ldn (or CNEL) dB(A)***	
Categories	***Uses***	***Interior***[(1)]	***Exterior***[(2)]
Residential	Single and multi-family, duplex, mobile homes	45	60[(3)]
Commercial	Hotel, motel, transient housing	45	60[(3)]
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Notes:
(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.
(2) The outdoor environment shall be limited to:

- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.
CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

(e) *Increases in Allowable* Noise Levels. If the measured ambient level exceeds any of the first four noise limit categories in Subdivision (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subdivision (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.
(f) *Reduction in Allowable Noise Levels.* If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 83-2 (Noise Standards for Stationary Noise Sources) shall be reduced by five dB(A).
(g) *Exempt Noise.* The following sources of noise shall be exempt from the regulations of this Section:
    (1) Motor vehicles not under the control of the commercial or industrial use.
    (2) Emergency equipment, vehicles, and devices.
    (3) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.
(h) Noise Standards for Other Structures. All other structures shall be sound attenuated against the combined input of all present and projected exterior noise to not exceed the criteria.

Table 83-4
Noise Standards for Other Structures

Typical Uses	12-Hour Equivalent Sound Level (Interior) in dBA Ldn
Educational, institutions, libraries, meeting facilities, etc.	45
General office, reception, etc.	50
Retail stores, restaurants, etc.	55
Other areas for manufacturing, assembly, testing, warehousing, etc.	65

Summary of Development Code Standards

Per Table 83-2 of the Development Code, as outlined above, the County's stationary noise limit for residential uses is 55 dBA during the hours of 7:00 AM to 10:00 PM and 45 dBA during the hours of 10:00 PM to 7:00 AM.

In addition, the County has exterior transportation noise limits for residential uses of 60 dBA Ldn or CNEL and interior limits of 45 dBA Ldn and CNEL as outlined in Table 83-3 of the Development Code.

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

MD conducted the sound level measurements in accordance with the County's and Caltrans (TeNS) technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed 5 feet above the ground for all measurements
- Sound level meters were calibrated (Larson Davis CAL 200) before and after each measurement
- Following the calibration of the equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the short-term noise measurements were recorded on field data sheets
- During any short-term noise measurements, any noise contaminations such as barking dogs, local traffic, lawnmowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

Noise monitoring locations were selected based on the nearest noise sources and sensitive uses relative to the proposed project site. Three (3) short-term 15-minute noise measurements were conducted at the project site and are illustrated in Exhibit E. Appendix A includes photos, a field sheet, and measured noise data.

5.3 Traffic Noise Impact

Per the project's Vehicle Miles Traveled (VMT) Screening, as prepared by TJW Engineering, Inc., the project is located within a low VMT-generating area and is consistent with the existing land use of the area. Therefore, the project is presumed to have a less-than-significant impact and qualifies for an exemption from a VMT analysis based on the County's guidelines. Thus, the traffic noise level projections were not analyzed for this project.

5.4 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, % usage factor, and baseline parameters for the project site.

The project was analyzed based on typical construction phases using CalEEMod methodology. Construction noise is expected to be loudest during the grading phase of construction. The construction noise calculation output worksheet is located in Appendix B.

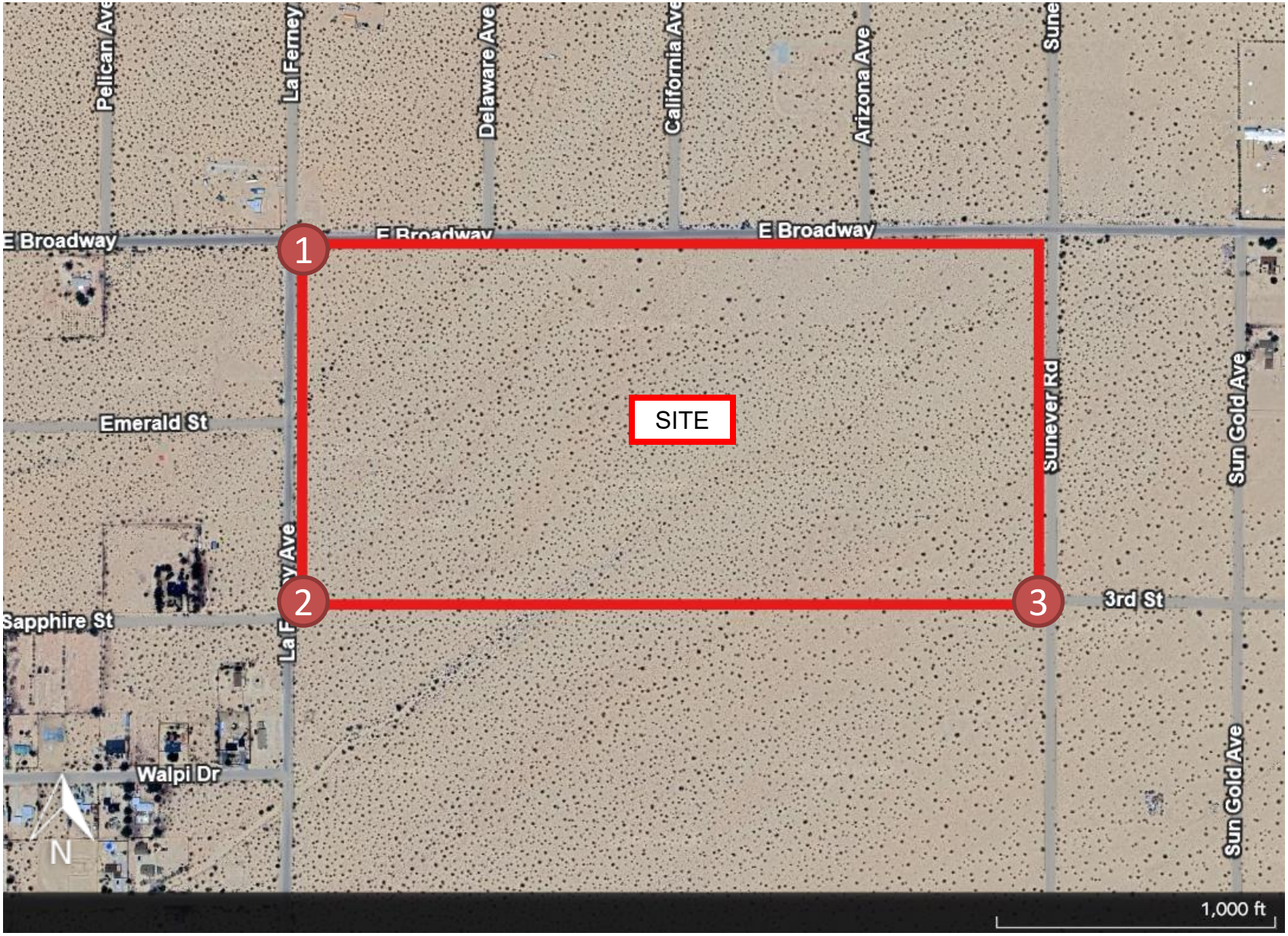
5.5 Stationary Noise Modeling

The future worst-case noise level projections were modeled using referenced sound level data for typical HVAC units by tonnage and transformers by kilovolt-ampere (kVA) capacity. The worst-case scenario considers one 10-ton HVAC unit working continuously on each single-family parcel and one 50 kVA transformer for every two single-family parcels. The reference sound level data is provided in Appendix C.

Exhibit E

Measurement Locations

= Short-Term Monitoring Location



6.0 Existing Noise Environment

Three (3) 15-minute ambient noise measurements were conducted at the project site. The noise measurements were taken to determine the existing ambient noise levels. Noise data indicate that traffic is the primary source of noise impacting the site and the adjacent uses.

6.1 Short-Term Noise Measurement Results

The results of the short-term noise measurements are presented in Table 2.

Table 2: Short-Term Noise Measurement Data (dBA)[1]

Location	Start Time	Stop Time	L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
NM1	7:45 AM	8:00 AM	43.4	60.7	28.4	55.4	44.2	38.7	34.6	30.3
NM2	8:11 AM	8:26 AM	44.2	66.6	28.5	51.2	43.8	35.6	33.7	31
NM3	8:47 AM	9:02 AM	35.7	49.4	31.4	41	38.5	35.9	34.4	32.7

Notes:
[1.] Short-term noise monitoring locations are illustrated in Exhibit E.

Noise data indicate the ambient noise level ranges from 36 to 44 dBA Leq at the project site. Additional field notes and photographs are provided in Appendix A

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to and from the project and compares the results to the County's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadways.

7.1 Future Exterior Noise

The exterior noise level off-site of the project will not be impacted by transportation-related sources but will be impacted by stationary sources from the site. The following outlines the exterior noise levels due to stationary sources associated with the proposed project.

7.1.1 Noise Impacts to Off-Site Receptors Due to Stationary Sources

On-site operational noise includes transformers and HVAC. All HVAC equipment is likely to be located on the ground next to the residences, with one 10-ton unit per household. Equipment will be at least 185 feet away from the nearest residential property line to the northwest (across the intersection of E Broadway and La Ferney Ave). The maximum sound power level from a single unit is 80 dBA. At 185 feet away, the sound pressure level is estimated to be 37 dBA. Thus, the noise due to HVAC operations will be below 45 dBA at the residential uses and meets the County's nighttime noise level limit for residential properties. Note that the project cannot impact itself. See Appendix C.

A typical residential 50 kVA transformer will be 40 dBA at a distance of 8 feet (per IEEE C57.12.20). The closest transformer will be located more than 100 feet away from the nearest residential use to the northwest. Thus, the noise due to transformer operations will be 18 dBA at the residential uses and meets the County's nighttime noise level limit for residential properties.

Combined, the stationary noise sources will be up to 37 dBA, which meets the County nighttime noise limit for adjacent residential properties.

8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise-generated characteristics of typical construction activities. The data is presented in Table 3.

Table 3: Typical Construction Noise Levels[1]

Equipment Powered by Internal Combustion Engines

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86

Impact Equipment

Type	Noise Levels (dBA) at 50 Feet
Saws	71 - 82
Vibrators	68 - 82

Notes:
[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the County's Code (Section 83.01.080(g)(3)). Construction is anticipated to occur during the permissible hours (7 AM to 7 PM) according to the County's Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing level within the project vicinity. Furthermore, noise reduction measures are provided to further reduce construction noise. The impact is considered less than significant; however, construction noise level projections are provided.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during the grading phase. A likely worst-case construction noise scenario during grading assumes the use of a grader, a dozer, two (2) excavators, two (2) tractors, and two (2) scrapers operating at an average of 1500 feet from the nearest sensitive receptor (center of the site to the residence to the northwest across E Broadway). The noise level is projected from the center of the site per the FTA Noise and Vibration manual. Table 4 outlines the estimated noise levels during construction at the nearest sensitive receptor (residence to the northwest).

Table 4: Construction Noise Levels

Phase	dBA Lmax	dBA Leq
Site Preparation	84.0	48.4
Grading	85.0	49.1
Paving	84.0	46.9
Building Construction	83.0	43.0
Arch Coating	78.0	34.7

Although construction activity will happen within the allowable hours as outlined by the County, construction noise reduction policies are included in Section 8.3. With adherence to the County's Code and implementation of the noise reduction policies, the impact from construction will be less than significant.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a vibratory roller. A vibratory roller has a vibration impact of 0.210 inches per second peak particle velocity (PPV) at 25 feet, which is perceptible but below any risk to architectural damage.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (25/D_{rec})^{n}$$

Where: PPV_{ref} = reference PPV at 25 ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.1 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 5 provide general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 5: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 6 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 6: Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

At a distance of 175 feet from the nearest residential building façade to the northwest, a vibratory roller would yield a worst-case 0.025 PPV (in/sec), which is perceptible but below the threshold of architectural damage for newer residential structures. Therefore, the impact is less than significant, and no mitigation is required.

8.3 Construction Noise Reduction Policies

Construction operations must follow the County's Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours of 7 AM to 7 PM. To further ensure that construction activities do not disrupt the adjacent land uses, the following best practices should be taken:

1. Construction shall occur during the permissible hours as defined in Section 83.01.080(6)(3).

2. During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.

3. The contractor shall locate equipment staging areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

4. Idling equipment shall be turned off when not in use.

5. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

9.0 References

State of California General Plan Guidelines: 2017. Governor's Office of Planning and Research.

San Bernardino County: General Policy Plan Hazards Element. October 2020.

San Bernardino County: Chapter 83.01, Section 83.01.080 Noise.

San Bernardino County: Countywide Plan Transportation Existing Conditions Report.

Federal Highway Administration. Noise Barrier Design Handbook. June 2017.

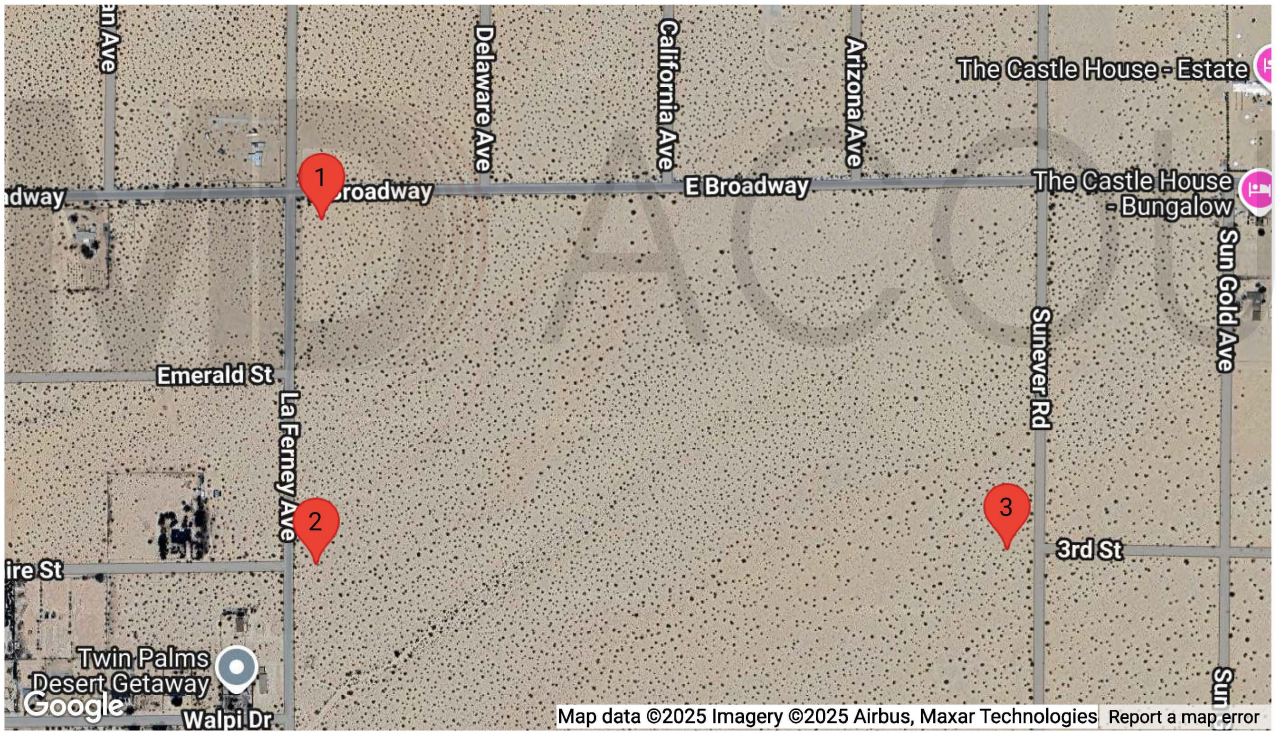
Federal Transit Administration. Transit Noise and Vibration Impact Assessment Manual. September 2018.

Appendix A:

Photographs Field Measurement Data

15-Minute Continuous Noise Measurement Datasheet - NM1 , NM2, NM3

Project Name:	TTM 20668 Joshua Tree Estates Noise	**Site Observations:**	
Project: #/Name:	1616-2025-001	53° to 58°, sunny clear and cool, winds 0 to 5 mph, vehicle traffic very light, no foot or air traffic	
Site Address/Location:	E Broadway and La Ferney Avenue		
Date:	11/26/2025		
Field Tech/Engineer:	Dennis Jordan / Bethany Wu		
Sound Meter:	XL2, NTI	**SN:** A2A-05967-E0	
Settings:	A-weighted, slow, 1-sec, 15-minute interval		
Site Id:	NM1 , NM2, NM3		



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1 , NM2, NM3

Project Name:	TTM 20668 Joshua Tree Estates Noise	**Calibrator:**	
Site Address/Location:	E Broadway and La Ferney Avenue	**Cal Check: Pre-test:**	**Post Test:**
Site Id:	NM1 , NM2, NM3		

Figure 1: NM1

Figure 2: NM2

Figure 3: NM3

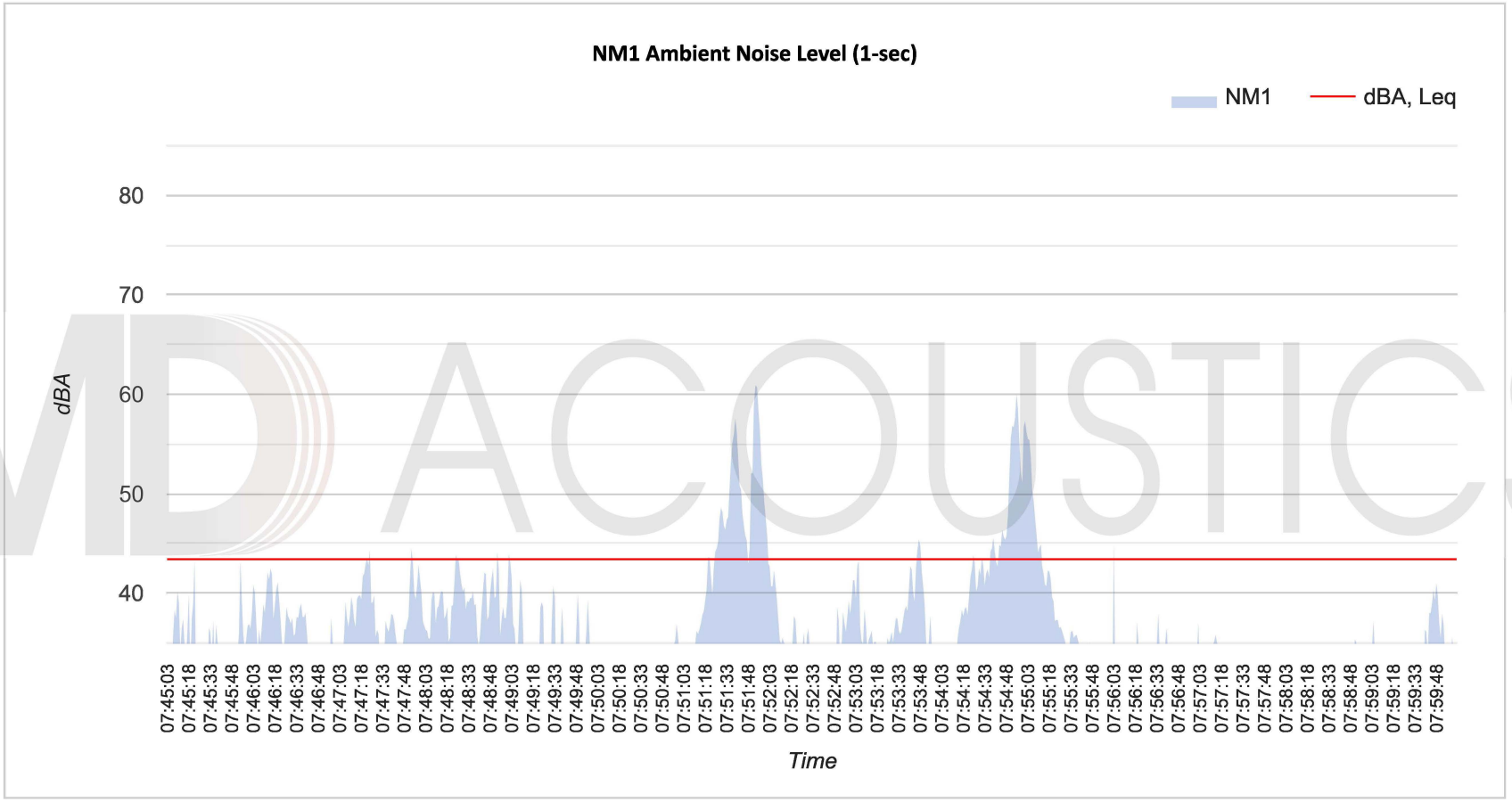
Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
NM1	7:45 AM	8:00 AM	43.4	60.7	28.4	55.4	44.2	38.7	34.6	30.3
NM2	8:11 AM	8:26 AM	44.2	66.6	28.5	51.2	43.8	35.6	33.7	31
NM3	8:47 AM	9:02 AM	35.7	49.4	31.4	41	38.5	35.9	34.4	32.7

MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM1

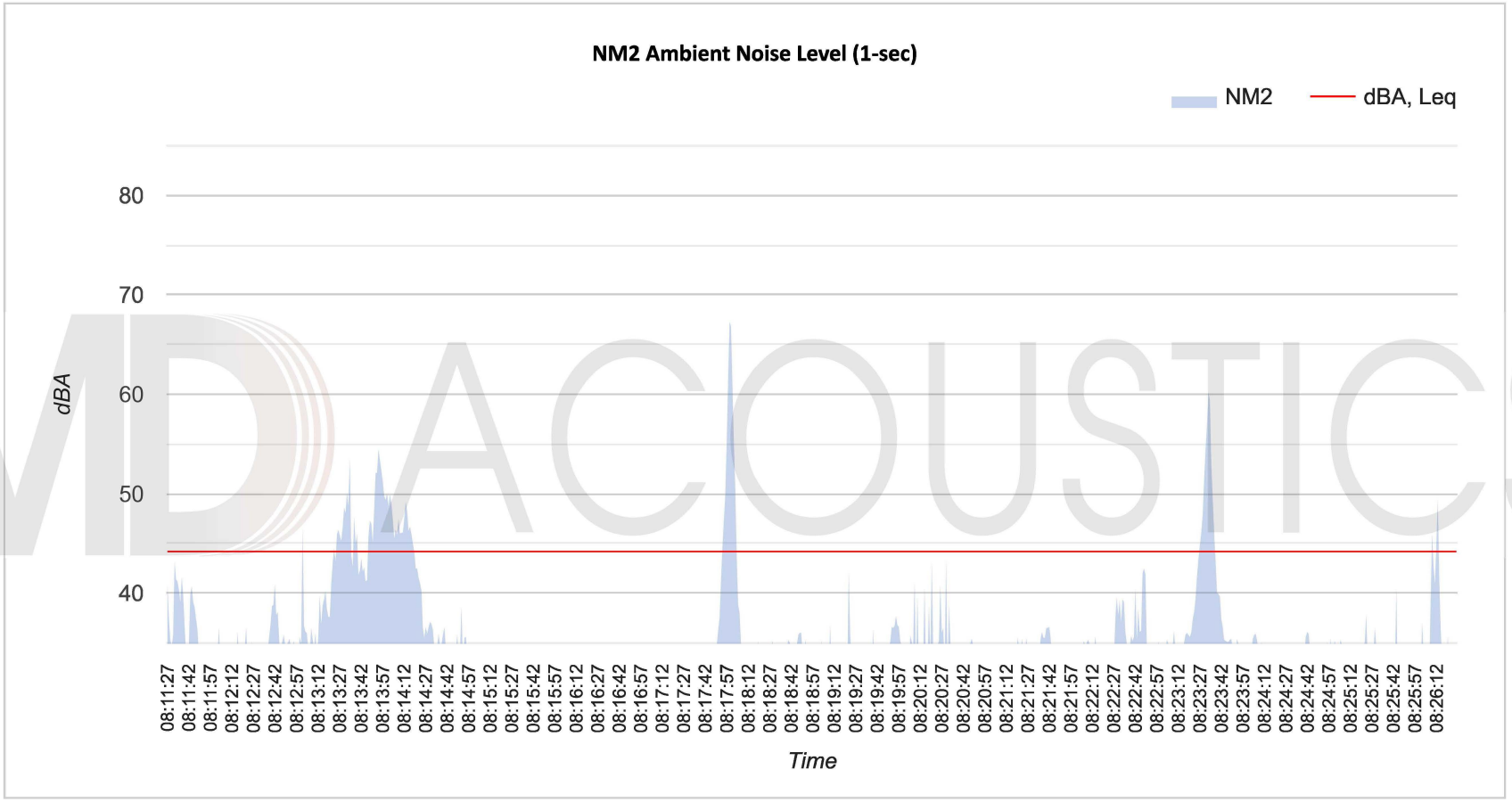
Project Name:	TTM 20668 Joshua Tree Estates Noise	**Site Topo:**	Open Field with a few single sto	**Noise Source(s) w/ Distance:**	
Site Address/Location:	E Broadway and La Ferney Avenue	**Meteorological Cond.:**	53°, sunny clear and cool, winds 0 to 5 mph	Broadway & La Ferney - Roadway / 25 ft	
Site Id:	NM1	**Ground Type:**	Dirt and Vegetation		



MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM2

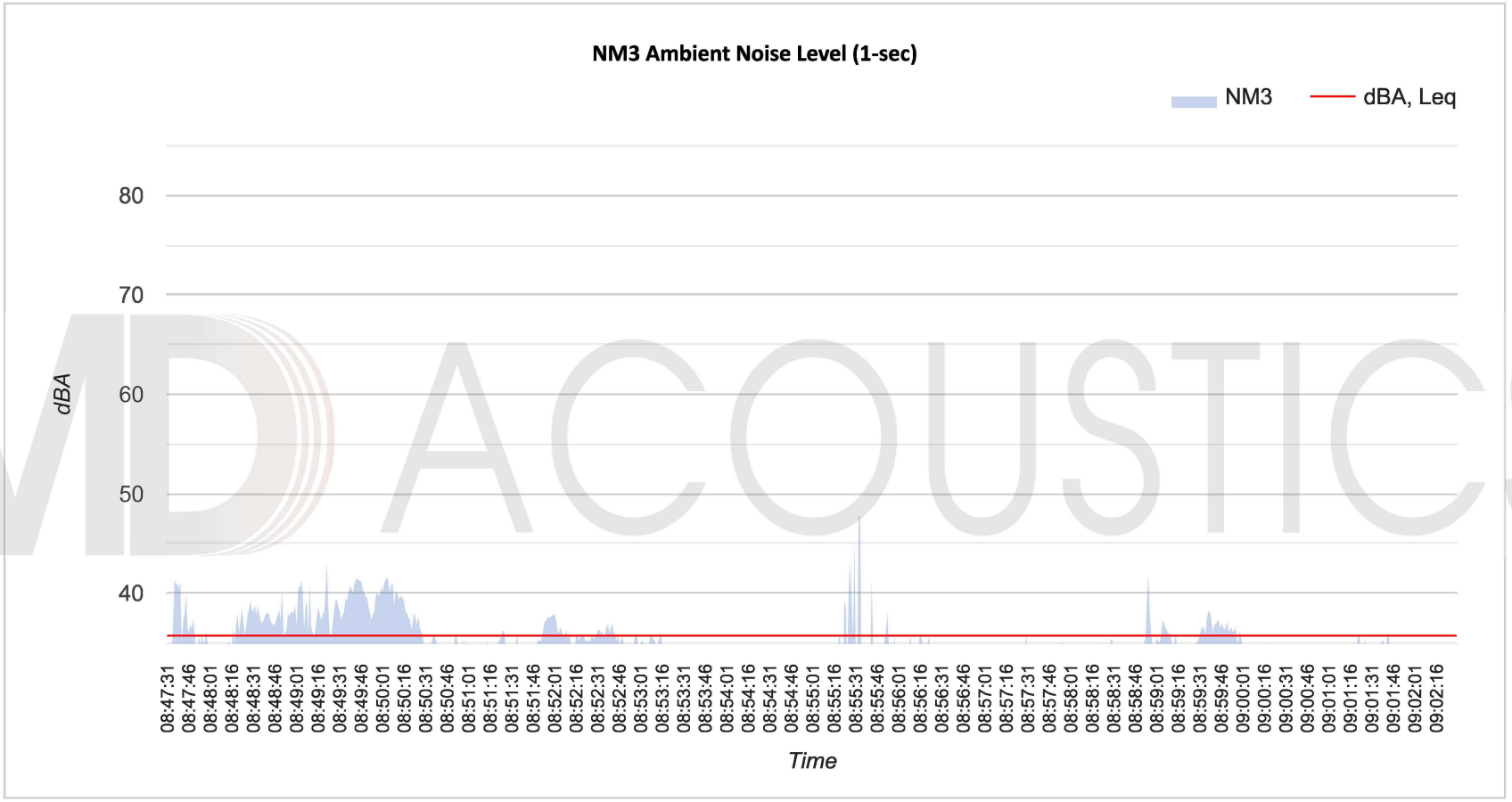
Project Name:	TTM 20668 Joshua Tree Estates Noise	**Site Topo:**	Open Field with a few single sto	**Noise Source(s) w/ Distance:**	
Site Address/Location:	E Broadway and La Ferney Avenue	**Meteorological Cond.:**	55°, sunny clear and cool, winds 0 to 5 mph	Broadway & Sapphire - Roadway / 25 ft	
Site Id:	NM2	**Ground Type:**	Dirt and Vegetation		



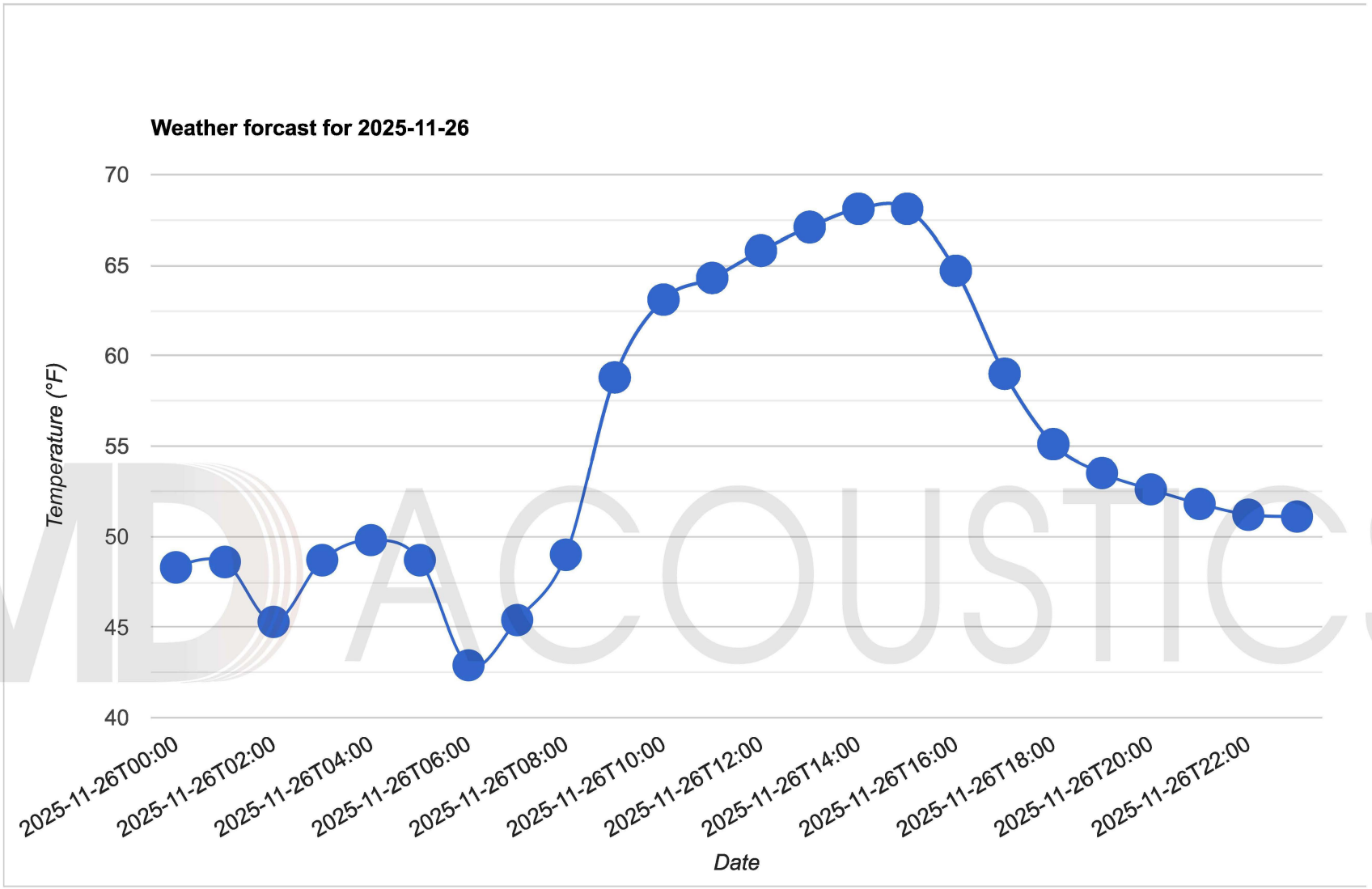
MD ACOUSTICS

15-Minute Continuous Noise Measurement Datasheet - Cont. - NM3

Project Name:	TTM 20668 Joshua Tree Estates Noise	**Site Topo:**	Open Field with a few single sto	**Noise Source(s) w/ Distance:**	
Site Address/Location:	E Broadway and La Ferney Avenue	**Meteorological Cond.:**	58°, sunny clear and cool, winds 0 to 5 mph	Sunever & 3rd - Roadway / 25 ft	
Site Id:	NM3	**Ground Type:**	Dirt and Vegetation		

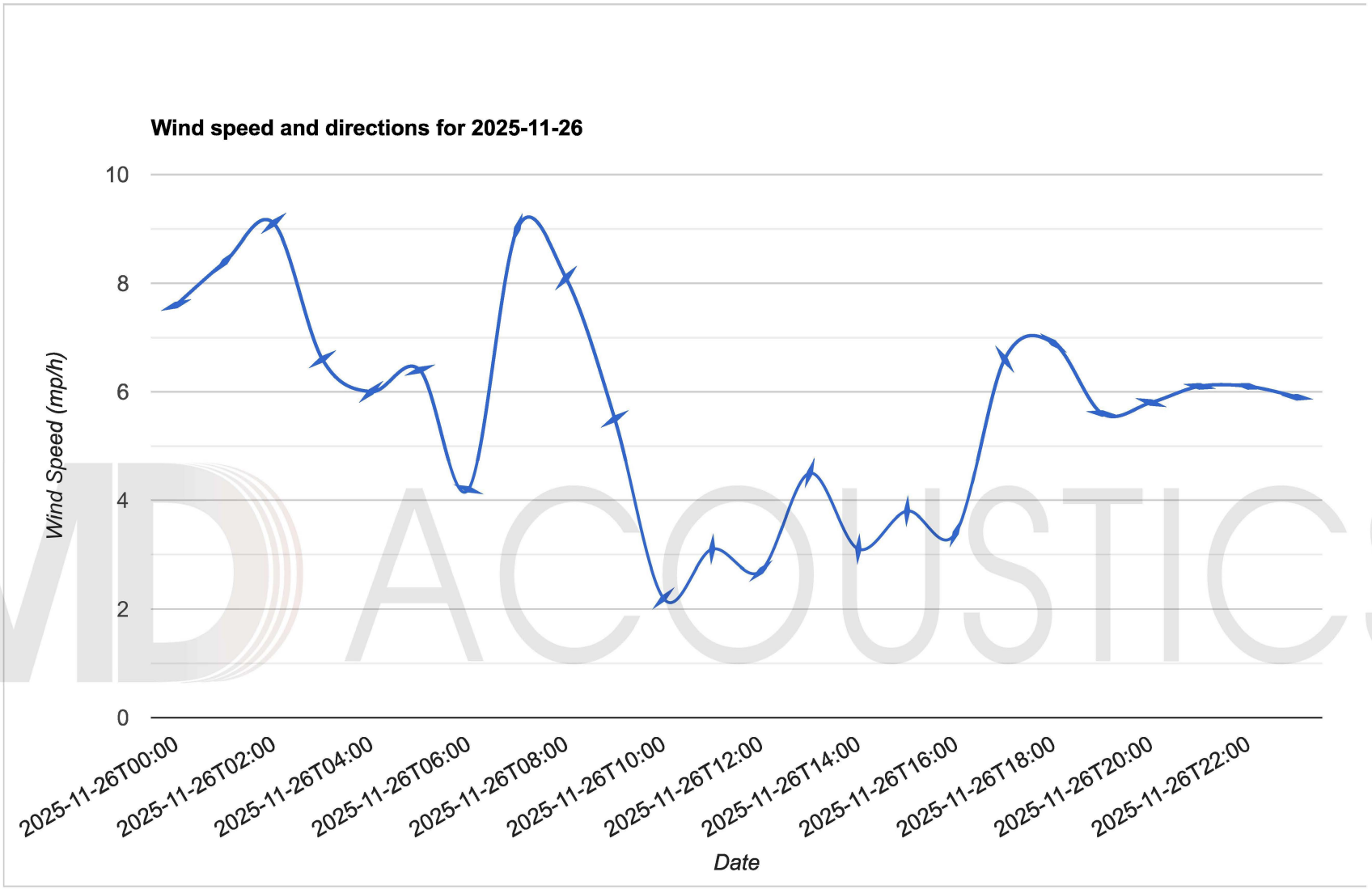


MD ACOUSTICS



Source: Global Forecast System (GFS) weather forcast model

MD ACOUSTICS



Source: Global Forecast System (GFS) weather forcast model

MD ACOUSTICS

Appendix B:

Construction Noise Modeling Output

Receptor - Residence 50 ft to the Northwest

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Edge of Site to Receptor, feet	Center of Site to Receptor, feet	Item Usage Percent[1]	Ground Factor[2]	Usage Factor	Receptor Item Lmax, dBA	Recptor. Item Leq, dBA
SITE PREP									
Grader	0	85	**50**	**1500**	40	**0.66**	0.40	0.0	0.0
Tractor	4	84	50	1500	40	0.66	0.40	84.0	40.7
Dozer	3	82	50	1500	40	0.66	0.40	82.0	38.7
Scraper	0	84	50	1500	40	0.66	0.40	0.0	0.0
							Log Sum	84.0	48.4
GRADE									
Dozer	1	82	50	1500	40	0.66	0.40	82.0	38.7
Tractor	2	84	50	1500	40	0.66	0.40	84.0	40.7
Grader	1	85	50	1500	40	0.66	0.40	85.0	41.7
Excavator	2	81	50	1500	40	0.66	0.40	81.0	37.7
Scraper	2	84	50	1500	40	0.66	0.40	84.0	40.7
								85.0	49.1
BUILD									
Crane	1	81	50	1500	16	0.66	0.16	81.0	33.7
Man lift	3	75	50	1500	20	0.66	0.20	75.0	28.7
Tractor	3	84	50	1500	40	0.66	0.40	84.0	40.7
Welder/Torch	1	74	50	1500	40	0.66	0.40	74.0	30.7
Generator	1	81	50	1500	50	0.66	0.50	81.0	38.7
								84.0	46.9
PAVE									
Paver	2	77	50	1500	50	0.66	0.50	77.0	34.7
Concrete Mixer Truck	0	79	50	1500	40	0.66	0.40	0.0	0.0
Roller	2	80	50	1500	20	0.66	0.20	80.0	33.7
Tractor	0	84	50	1500	40	0.66	0.40	0.0	0.0
Compactor (ground)	2	83	50	1500	20	0.66	0.20	83.0	36.7
								83.0	43.0
ARCH COAT									
Compressor (air)	1	78	50	1500	40	0.66	0.40	78.0	34.7
								78.0	34.7

[1]FHWA Construction Noise Handbook: Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors

VIBRATION LEVEL IMPACT

Project:	Joshua Tree Estates - TTM 20668	Date: 11/26/25
Source:	Vibratory Roller	
Scenario:	Unmitigated	
Location:	Northwest residential building	
Address:	SEC of E Broadway & La Ferney Ave, Joshua Tree, CA	

PPV = PPVref(25/D)^n (in/sec)

DATA INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN BLUE
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	175.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

DATA OUT RESULTS

PPV =	**0.025**	IN/SEC	OUTPUT IN RED

Appendix C:
HVAC Reference

50PG03–14
Ultra High Efficiency Single Package Electric Cooling with Optional Electric Heat Commercial Rooftop Units with Puron® (R–410A) Refrigerant, Optional EnergyX™ (Energy Recovery Ventilator)
2 to 12.5 Nominal Tons

Carrier
turn to the experts

Product Data

CENTURION

DEALER DESIGN AWARDS
the NEWS | GOLD

BUILDINGS magazine
Editors' Choice
TOP 100 PRODUCTS
2005

Puron
the environmentally sound refrigerant

AHRI* CAPACITY RATINGS

50PG03-14

UNIT 50PG	NOMINAL CAPACITY (Tons)	NET COOLING CAPACITY (Btuh)	TOTAL POWER (kW)	SEER	EER†	SOUND RATING (dB)	IEER
03	2.0	24,000	2.1	14.1	11.5	75	—
04	3.0	35,800	3.1	14.1	11.7	73	—
05	4.0	47,500	4.0	15.0	12.2	72	—
06	5.0	58,500	4.9	14.8	12.2	78	—
07	6.0	69,000	5.8	—	12.2	78	13.0
08	7.5	88,000	7.0	—	12.7	80	13.5
09	8.5	102,000	8.4	—	12.4	80	13.4
12	10.0	119,000	9.9	—	12.2	80	13.0
14	12.5	150,000	13.2	—	11.5	83	11.6

LEGEND
EER – Energy Efficiency Ratio
SEER – Seasonal Energy Efficiency Ratio

*Air Conditioning, Heating and Refrigeration Institute.
† AHRI does not require EER ratings for units with capacity below 65,000 Btuh.

NOTES:
1. Tested in accordance with AHRI Standards 210–94 (sizes 03–12), 360–93 (size 14).
2. Ratings are net values, reflecting the effects of circulating fan heat.
3. Ratings are based on:
Cooling Standard: 80°F db, 67°F wb indoor entering–air temperature and 95°F db air entering outdoor unit.
IPLV Standard: 80°F db, 67°F wb indoor entering–air temperature and 80°F db outdoor entering–air temperature.
4. All 50PG units are in compliance with Energy Star® and ASHRAE 90.1 2010 Energy Standard for minimum SEER and EER requirements.
5. Units are rated in accordance with AHRI sound standards 270 or 370.
6. Per AHRI, Integrated Energy Efficiency Ratio (IEER) became effective beginning January 1, 2010. Integrated Part–Load Value (IPLV) was superseded by IEER on January 1, 2010. IEER is intended to be a measure of merit for the part load performance of the unit. Each building may have different part load performance due to local occupancy schedules, building construction, building location and ventilation requirements. For specific building energy analysis, an hour–by–hour analysis program should be used.

Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program For verification of certification for individual products, go to www.ahridirectory.org.

SAN BERNARDINO COUNTY
NOTICE OF OPPORTUNITY TO CONSULT
Tentative Tract Map (20668)

In accordance with Assembly Bill 52 (AB 52), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA.

Project Title: Tentative Tract Map (20668) to subdivide one (1) parcel into thirty-two (32) parcels.

Project No.: PROJ-2023-00129

Project Location: SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01

Project Description: TENTATIVE TRACT MAP (TTM) RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Notice of Opportunity to Consult: In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send written request to:

Maryn Wells, Planner
San Bernardino County
Land Use Services Department - Planning Division
385 N. Arrowhead Avenue 1st floor
San Bernardino, CA 92415

You may obtain more information about the project or request consultation by contacting the Planner directly at (760) 776-6146 or via email at maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above.

If we do not receive a request within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation.

Vicinity Map

Project Site (see attached TTM)

Maryn Wells, Planner
County of San Bernardino
Land Use Services Department - Planning Division
385 N. Arrowhead Avenue 1st floor
San Bernardino, CA 92415

385 N. Arrowhead Avenue San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Mark Wardlaw
Director

May 30, 2024 **SENT VIA EMAIL**

Darrell Mike, Tribal Chairman
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA 92236
29chairman@29palmsbominsn.gov

RE: NOTICE OF OPPORTUNITY TO CONSULT - RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) 80-ACRE PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Dear Mr. Mike,

On May 1, 2024, the San Bernardino Land Use Services Department initiated environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. The subject entity is proposing to subdivide an approximately 80-acre parcel into thirty-two (32) parcels approximately 2.5 acres each, specifically located at the southwest corner of Broadway St. and Laferney Ave. in Joshua Tree. A project location map and a project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 North Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

Maryn Wells, Planner

Enclosures: Notice of Opportunity to Consult - Location and Description
Site Plan/TTM

Cc: Project File

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Luther Snoke Chief Executive Officer

385 N. Arrowhead Avenue San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Mark Wardlaw
Director

May 30, 2024 **SENT VIA EMAIL**

Bryan Etsitty, Acting Director
Colorado River Indian Tribes
26600 Mohave Road
Parker, AZ 85344
critthpo@crit-nsn.gov

RE: NOTICE OF OPPORTUNITY TO CONSULT - RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) 80-ACRE PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Dear Mr. Etsitty:

On May 1, 2024, the San Bernardino Land Use Services Department initiated environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. The subject entity is proposing to subdivide an approximately 80-acre parcel into thirty-two (32) parcels approximately 2.5 acres each, specifically located at the southwest corner of Broadway St. and Laferney Ave. in Joshua Tree. A project location map and a project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 North Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

Maryn Wells, Planner

Enclosures: Notice of Opportunity to Consult - Location and Description
Site Plan/TTM

Cc: Project File

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Luther Snoke Chief Executive Officer

385 N. Arrowhead Avenue San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Mark Wardlaw
Director

May 30, 2024 **SENT VIA EMAIL**

Linda Otero
Fort Mojave Indian Tribe
P.O. Box 5990
Mohave Valley, AZ 86440
lindaotero@fortmojave.com

RE: NOTICE OF OPPORTUNITY TO CONSULT - RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) 80-ACRE PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Dear Ms. Otero:

On May 1, 2024, the San Bernardino Land Use Services Department initiated environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. The subject entity is proposing to subdivide an approximately 80-acre parcel into thirty-two (32) parcels approximately 2.5 acres each, specifically located at the southwest corner of Broadway St. and Laferney Ave. in Joshua Tree. A project location map and a project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 North Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

Maryn Wells, Planner

Enclosures: Notice of Opportunity to Consult - Location and Description
Site Plan/TTM

Cc: Project File

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Luther Snoke Chief Executive Officer

385 N. Arrowhead Avenue San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Mark Wardlaw
Director

May 30, 2024 **SENT VIA EMAIL**

Ann Brierty, Tribal Historic Preservation Officer
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220
ABrierty@morongo-nsn.gov

RE: NOTICE OF OPPORTUNITY TO CONSULT - RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Dear Ms. Brierty:

On May 1, 2024, the San Bernardino Land Use Services Department initiated environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. The subject entity is proposing to subdivide an approximately 80-acre parcel into thirty-two (32) parcels approximately 2.5 acres each, specifically located at the southwest corner of Broadway St. and Laferney Ave. in Joshua Tree. A project location map and a project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 North Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

Maryn Wells, Planner

Enclosures: Notice of Opportunity to Consult - Location and Description
Site Plan/TTM

Cc: Project File

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Luther Snoke Chief Executive Officer

385 N. Arrowhead Avenue San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Mark Wardlaw
Director

May 30, 2024 **SENT VIA EMAIL**

Alexandra McCleary, Ph.D.
Cultural Resources Management Department
Yuhaaviatam of the San Manuel Nation
26569 Community Center Drive
Highland, CA 92346
Alexandra.McCleary@sanmanuel-nsn.gov

RE: NOTICE OF OPPORTUNITY TO CONSULT - RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) 80-ACRE PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Dear Dr. McCleary:

On May 1, 2024, the San Bernardino Land Use Services Department initiated environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. The subject entity is proposing to subdivide an approximately 80-acre parcel into thirty-two (32) parcels approximately 2.5 acres each, specifically located at the southwest corner of Broadway St. and Laferney Ave. in Joshua Tree. A project location map and a project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 North Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

Maryn Wells, Planner

Enclosures: Notice of Opportunity to Consult - Location and Description
Site Plan/TTM

Cc: Project File

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Luther Snoke Chief Executive Officer

385 N. Arrowhead Avenue San Bernardino, CA 92415 | Phone: 909.387.8311 Fax: 909.387.3223
www.SBCounty.gov

SAN BERNARDINO COUNTY

Land Use Services Department
Planning

Mark Wardlaw
Director

May 30, 2024 **SENT VIA EMAIL**

Andrew Salas, Chairman
Gabrieleno Band of Mission Indians - Kizh Nation
P.O Box 393
Covina, CA 91723
admin@gabrielenoindians.org

RE: NOTICE OF OPPORTUNITY TO CONSULT - RESIDENTIAL TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) 80-ACRE PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Dear Mr. Salas:

On May 1, 2024, the San Bernardino Land Use Services Department initiated environmental review under the California Environmental Quality Act (CEQA) for the aforementioned project. The subject entity is proposing to subdivide an approximately 80-acre parcel into thirty-two (32) parcels approximately 2.5 acres each, specifically located at the southwest corner of Broadway St. and Laferney Ave. in Joshua Tree. A project location map and a project description are enclosed for your information.

In accordance with Assembly Bill 52 (AB 52), which added various provisions to the California Public Resources Code (PRC) that concern Tribal Cultural Resources, including Section 21080.3.1(d), we are responding to your request to be notified of projects in the geographic area that is traditionally and culturally affiliated with your Tribe and that will be reviewed by this entity under CEQA. Your name was provided to us as the point of contact for your Tribe. We are hereby notifying you of an opportunity to consult with us regarding the potential for this project to impact Tribal Cultural Resources, as defined in Section 21074 of the PRC. The purposes of tribal consultation under AB 52 are to determine, as part of the CEQA review process, whether or not Tribal Cultural Resources are present within the project area, and if so, whether or not those resources will be significantly impacted by the project. If Tribal Cultural Resources may be significantly impacted, then consultation will also help to determine the most appropriate way to avoid or mitigate those impacts.

In accordance with Section 21080.3.1(d) of the PRC, you have 30 days from the receipt of this letter to request consultation in writing for this project. Please send your written request to me at: 385 North Arrowhead Avenue, 1st Floor, San Bernardino, CA 92415 or by email to maryn.wells@lus.sbcounty.gov. In your request, please reference the project name and number as indicated above. If we do not receive a request for consultation within 30 days of your receipt of this letter, we will proceed forward in the CEQA review process without consultation. Thank you and we look forward to your response.

Respectfully,

Maryn Wells, Planner

Enclosures: Notice of Opportunity to Consult - Location and Description
Site Plan/TTM

Cc: Project File

BOARD OF SUPERVISORS
Col. Paul Cook (Ret.) Vice Chairman, First District | Jesse Armendarez Second District | Dawn Rowe Chair, Third District | Curt Hagman Fourth District | Joe Baca, Jr. Fifth District
Luther Snoke Chief Executive Officer

Header with Tribal Seal

TWENTY-NINE PALMS BAND OF MISSION INDIANS

46-200 Harrison Place. Coachella, CA. 92236. Ph. 760.863.2444. Fax: 760.863.2449

July 12, 2024

San Bernardino County
Maryn Wells, Planner
385 North Arrowhead Avenue, 1st Floorr
San Bernardino, CA 92415

RE: Draft Environmental Assessment (FEB 2024) PROJ-2023-00129:Tenative Tract Map (20688)_to subdivide one parcel into thirty-two parcels

Dear Maryn:

This letter is in regards to an informal consultation and in compliance with AB-52 and Draft Environmental Assessment (FEB 2024) PROJ-2023-00129:Tenative Tract Map (20688)_to subdivide one parcel into thirty-two parcels

After reviewing the proposed project, the Twenty-Nine Palms Band of Mission Indians has determined: The project is outside of the known Chemehuevi Traditional Use Area. The other tribes who do have cultural affiliation with the project area should be contacted.

If you have any questions, please do not hesitate to contact the Tribal Historic Preservation Office at (760) 775-3259 or by email at Christopher.Nicosia@29palmsbomi-nsn.gov.

Sincerely,

Christopher Nicosia
Cultural Resources Manager, Twenty-Nine Palms Band of Mission Indians

Wells, Maryn

From: Tribal Historic Preservation Office <thpo@morongo-nsn.gov>
Sent: Wednesday, July 17, 2024 1:21 PM
To: Wells, Maryn
Cc: Laura Chatterton
Subject: AB-52 Consultation for Proposed PROJ-2023-000129, County of San Bernardino, California
Attachments: SBCO PROJ 2023 000129 MBMI AB 52 17July24.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

You don't often get email from thpo@morongo-nsn.gov. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

The Morongo Band of Mission Indians (Tribe/MBMI) Tribal Historic Preservation Office received the County of San Bernardino (County) letter regarding the above referenced project on June 27, 2024. The proposed PROJ-2023-000129 Project (Project) is located within the ancestral territory and traditional use area of the Cahuilla and Serrano people of the Morongo Band of Mission Indians.
Tribal cultural resources are non-renewable resources and therefore of high importance to the Morongo Tribe, therefore, tribal participation (a.k.a. tribal monitors) is recommended during all ground disturbing activities. We look forward to working with the County to protect these irreplaceable resources out of respect for ancestors of the Morongo people who left them there, and for the people of today and for generations to come.
Projects within this area are potentially sensitive for cultural resources regardless of the presence or absence of remaining surface artifacts and features. Our office requests to initiate government-to-government consultation under Assembly Bill (AB) 52 (California Public Resources Code § 21080.3.1). Please see our attached letter.

Respectfully,

Laura Chatterton
Cultural Resource Specialist
Tribal Historic Preservation Office
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220
O: (951) 755.5256
C: (951) 663.7570

CONFIDENTIALITY: This e-mail may contain Privacy Act Data/Sensitive Data which is intended only for the use of the individual(s) to whom it is addressed. It may contain information that is privileged, confidential, or otherwise protected from disclosure under applicable laws. If you are not the intended recipient, you are hereby notified that any distribution or copy of this email is strictly prohibited.

The information contained in this communication is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, or distribution of this information is strictly prohibited and may be unlawful.

For your safety, the contents of this email have been scanned for viruses and malware.

From:	Raza, Kumail
To:	Ann Brierty
Cc:	Casey, Shannon; Huerta, Arlene; Norman Dimmick; THPO Department; Perez, Aldo
Subject:	RE: PROJ-2023-00129: Joshua Tree Estates Morongo Consultation
Date:	Thursday, June 18, 2026 8:49:52 AM
Attachments:	image001.png

Thanks, Ann!

Best Regards,

Kumail Raza, AICP
Planning Manager
E: kumail.raza@lus.sbcounty.gov
D: (909) 387-5366
Land Use Services Department
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415

SAN BERNARDINO COUNTY

From: Ann Brierty <ABrierty@morongo-nsn.gov>
Sent: Wednesday, June 17, 2026 6:05 PM
To: Raza, Kumail <Kumail.Raza@lus.sbcounty.gov>
Cc: Casey, Shannon <Shannon.Casey@lus.sbcounty.gov>; Huerta, Arlene <Arlene.Huerta@lus.sbcounty.gov>; Norman Dimmick <ndimmick@morongo-nsn.gov>; THPO Department <THPODepartment@morongo-nsn.gov>
Subject: Re: PROJ-2023-00129: Joshua Tree Estates Morongo Consultation
Importance: High

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

Dear Kumail,
Thank you for your patience. Please find attached Morongo Band of Mission Indians (MBMI) MM's and the original letter sent to SB County.

Please note that Laura Chatterton is no longer employed at MBMI. Please welcome @Norman Dimmick as the new Cultural Resource Specialist, as he will be assisting THPO with all CEQA projects.

I do have an ask, based upon the email of June 11 below: *As discussed, please find attached the relevant project information*. The relevant project information was not attached or may not have come through. I'm requesting to have these resent to us.

Let me know if you need any additional information.

Respectfully,

Ann Brierty
Tribal Historic Preservation Officer
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220
O: (951) 755.5259
M: (951) 663.2842

CONFIDENTIALITY: This e-mail may contain Privacy Act Data/Sensitive Data which is intended only for the use of the individual(s) to whom it is addressed. It may contain information that is privileged, confidential, or otherwise protected from disclosure under applicable laws. If you are not the intended recipient, you are hereby notified that any distribution or copy of this email is strictly prohibited.

From: Raza, Kumail <Kumail.Raza@lus.sbcounty.gov>
Sent: Wednesday, June 17, 2026 8:35 AM
To: Ann Brierty <ABrierty@morongo-nsn.gov>
Cc: Casey, Shannon <Shannon.Casey@lus.sbcounty.gov>; Huerta, Arlene <Arlene.Huerta@lus.sbcounty.gov>
Subject: RE: PROJ-2023-00129: Joshua Tree Estates Morongo Consultation

Hi Ann,

Just following up on this again. The applicant is very anxious to proceed so we would love to begin consultation with your tribe ASAP.

Best Regards,

Kumail Raza, AICP

Morongo Band of Mission Indians Cultural Resource Mitigation Measures:

CR-1: **Native American Treatment Agreement** Prior to the issuance of grading permits, the applicant shall enter into a Tribal Monitoring Agreement with the Morongo Band of Mission Indians for the project. The Tribal Monitor(s) shall be on-site during all ground-disturbing activities (including, but not limited to, clearing, grubbing, tree and bush removal, grading, trenching, fence post placement and removal, construction excavation, excavation for all utility and irrigation lines, and landscaping phases of any kind). The Tribal Monitor(s) shall have the authority to temporarily divert, redirect, or halt the ground-disturbing activities to allow identification, evaluation, and potential recovery of cultural resources and/or tribal cultural resources.

CR-2: **Retention of Archaeologist** Prior to any ground-disturbing activities (including, but not limited to, clearing, grubbing, tree and bush removal, grading, trenching, fence post replacement and removal, construction excavation, excavation for all utility and irrigation lines, and landscaping phases of any kind), and prior to the issuance of grading permits, the Applicant shall retain a qualified archaeologist who meets the U.S. Secretary of the Interior Standards (SOI). The archaeologist shall be present during all ground-disturbing activities to identify any known or suspected archaeological and/or cultural resources. The archaeologist will conduct a Cultural Resource Sensitivity Training, in conjunction with the Tribe[s] Tribal Historic Preservation Officer (THPO), and/or designated Tribal Representative. The training session will focus on the archaeological and tribal cultural resources that may be encountered during ground-disturbing activities as well as the procedures to be followed in such an event.

CR-3: **Cultural Resource Management Plan** Prior to any ground-disturbing activities the project archaeologist shall develop a Cultural Resource Management Plan (CRMP) and/or Archaeological Monitoring and Treatment Plan (AMTP) to address the details, timing, and responsibilities of all archaeological and cultural resource activities that occur on the project site. This Plan shall be written in consultation with the Consulting Tribe[s] and at minimum, shall include the following: (1) the approved Mitigation Measures (MM)/Conditions of Approval (COA), (2) procedures for each MM/COA, (3) the contact information for all pertinent parties, (4) parties' responsibilities, and (5) an overview of the project schedule.

CR-4: Pre-Grade Meeting The retained qualified archeologist and Consulting Tribe[s] representative shall attend the pre-grade meeting with the grading contractors to explain and coordinate the requirements of the monitoring plan.

CR-5: On-site Monitoring During all ground-disturbing activities the qualified archaeologist and the Tribal Monitor(s) shall be on-site full-time. The frequency of inspections shall depend on the rate of excavation, the materials excavated, and any discoveries of Tribal Cultural Resources as defined in California Public Resources Code Section 21074. Archaeological and Native American monitoring will be discontinued when the depth of grading and the soil conditions no longer retain the potential to contain cultural deposits. The qualified archaeologist, in consultation with the Tribal Monitor(s), shall be responsible for determining the duration and frequency of monitoring.

CR-6: Inadvertent Discovery of Cultural Resources In the event that previously unidentified cultural resources are discovered /unearthed during construction, the qualified archaeologist and the Tribal Monitor(s) shall have the authority to temporarily divert and/or temporarily halt ground-disturbance activities in the area of discovery to allow for the evaluation of potentially significant cultural resources. Isolates and clearly non-significant deposits shall be minimally documented in the field and collected so the monitored ground-disturbing activity can proceed.

If a potentially significant cultural resource(s) is discovered, work shall stop within a 60-foot perimeter of the discovery and an Environmentally Sensitive Area (ESA) physical demarcation/barrier constructed. All work shall be diverted away from the vicinity of the find(s), so that it/they can be evaluated by the qualified archaeologist and Tribal Monitor[s]. The archaeologist shall notify the Lead Agency and Consulting Tribe[s] of said discovery. The qualified archaeologist, in consultation with the Lead Agency, the Consulting Tribe[s], and the Tribal monitor, shall determine the significance of the discovered resource. A recommendation for the treatment and disposition of the Tribal Cultural Resource shall be made by the qualified archaeologist in consultation with the Tribe[s] and the Tribal monitor[s] and be submitted to the Lead Agency for review and approval.

Below are the possible treatments and dispositions of significant cultural resources in order of CEQA preference:

A. Full avoidance.

B. If avoidance is not feasible, Preservation in place.

If Preservation in place is not feasible, all items shall be reburied in an area away from any future impacts and reside in a permanent conservation easement or Deed Restriction.

C. If all other options are proven to be infeasible, data recovery through excavation and then curation in a Curation Facility that meets the Federal Curation Standards (36 CFR 79).

Unless otherwise agreed upon by all parties, all removed items from the Project shall be temporarily curated on-site in a secure and locked location (i.e., Conex box, a lockable office or drawer with restricted access to it, etc.). A periodic inventory must be maintained and provided to Consulting Tribe[s].

CR-7: Inadvertent Discovery of Human Remains The Morongo Band of Mission Indians requests the following specific conditions to be imposed in order to protect Native American human remains and/or cremations. ***No photographs are to be taken except by the coroner, with written approval by the Consulting Tribe[s].***

A. Should human remains and/or cremations be encountered on the surface or during any and all ground-disturbing activities (i.e., clearing, grubbing, tree and bush removal, grading, trenching, fence post placement and removal, construction excavation, excavation for all water supply, electrical, and irrigation lines, and landscaping phases of any kind), work in the immediate vicinity of the discovery shall immediately stop within a 100-foot perimeter of the discovery. The area shall be protected by the establishment of an ESA with a marked boundary. Project personnel/observers will be restricted from entry into the ESA. The County Coroner is to be contacted within 24 hours of discovery. The County Coroner has 48 hours to make his/her determination pursuant to State and Safety Code §7050.5. and Public Resources Code (PRC) § 5097.98.

B. In the event that the human remains and/or cremations are identified as Native American, the Coroner shall notify the Native American Heritage Commission (NAHC) within 24 hours of determination pursuant to subdivision (c) of HSC §7050.5.

C. The NAHC shall immediately notify the person or persons it believes to be the Most Likely Descendant (MLD). The MLD has 48 hours, upon being granted access to the Project site, to inspect the site of discovery and make his/her recommendation for final treatment and disposition, with appropriate dignity, of the remains and all associated grave goods pursuant to PRC §5097.98

D. If the Morongo Band of Mission Indians has been named the MLD or Co-MLD, the Tribe may wish to rebury the human remains and/or cremation and sacred items in their place of discovery with no further disturbance where they will reside in perpetuity. The place(s) of reburial will not be disclosed by any party and is exempt from the California Public Records Act (California Government Code § 6254[r]). Reburial location of human remains and/or cremations will be determined by the Tribe's MLD, the landowner, and the City Planning Department.

CR-8: **FINAL REPORT:** The final report[s] created as a part of the project (CRMP/AMTP, isolate records, site records, survey reports, testing reports, etc.) shall be submitted to the Lead Agency and Consulting Tribe[s] for review and comment. After approval of all parties, the final reports are to be submitted to the appropriate Information Center (IC), and the Consulting Tribe[s].

TRIBAL HISTORIC PRESERVATION OFFICE

VIA ELECTRONIC MAIL

maryn.wells@lus.sbcounty.gov

Maryn Wells, Planner
San Bernardino County
Land Use Services Department - Planning Division
385 N. Arrowhead Avenue 1s1 floor
San Bernardino, CA 92415

MORONGO BAND OF MISSION INDIANS
A SOVEREIGN NATION

July 17, 2024

RE: AB-52 Consultation for Proposed PROJ-2023-000129, County of San Bernardino, California

The Morongo Band of Mission Indians (Tribe/MBMI) Tribal Historic Preservation Office received the County of San Bernardino (County) letter regarding the above referenced project on June 27, 2024. The proposed PROJ-2023-000129 Project (Project) is located within the ancestral territory and traditional use area of the Cahuilla and Serrano people of the Morongo Band of Mission Indians.

Tribal cultural resources are non-renewable resources and therefore of high importance to the Morongo Tribe, therefore, tribal participation (a.k.a. tribal monitors) is recommended during all ground disturbing activities. We look forward to working with the County to protect these irreplaceable resources out of respect for ancestors of the Morongo people who left them there, and for the people of today and for generations to come.

Projects within this area are potentially sensitive for cultural resources regardless of the presence or absence of remaining surface artifacts and features. Our office requests to initiate government-to-government consultation under Assembly Bill (AB) 52 (California Public Resources Code § 21080.3.1) and requests the following from the County to ensure meaningful consultation:

- Currently proposed Project design and Mass Grading Maps
- A records search conducted at the appropriate California Historical Resources Information System (CHRIS) center with at least a 1.0-mile search radius from the project boundary. If this work has already been done, please furnish copies of the cultural resource documentation (ArcMap Shapefiles, reports and site records) generated through this search so that we can compare and review with our records to begin productive consultation.
- Tribal participation (a.k.a. tribal monitors) during the pedestrian survey and testing, if this fieldwork has not already taken place. In the event that archaeological crews have completed this work, our office requests a copy of the current Phase I study or other cultural assessments (including the cultural resources inventory).
- Shapefiles of the Projects area of effect (APE)
- Geotechnical Report

This letter does not conclude consultation. Upon receipt of the requested documents the MBMI THPO may further provide recommendations and/or mitigation measures.

The lead contact for this Project is Bernadette Ann Brierty, Tribal Historic Preservation Officer (THPO). MBMI Cultural Resource Specialist Laura Chatterton, will be assisting the Tribe in the review of this project. Please do not hesitate to contact us at ABrierty@morongo-nsn.gov, THPO@morongo-nsn.gov,

lchatterton@morongo-nsn.gov or (951) 663-2842, should you have any questions. The Tribe looks forward to meaningful government-to-government consultation with the County.

Respectfully,

Bernadette Ann Brierty
Tribal Historic Preservation Officer
Morongo Band of Mission Indians

CC: Morongo THPO

12700 Pumarra Road – Banning, CA 92220 – (951) 755-5259 – Fax (951) 572-6004 – THPO@morongo-nsn.gov

Mineo-Wells, Maryn

From: Mineo-Wells, Maryn
Sent: Friday, August 8, 2025 3:50 PM
To: Ann Brierty
Subject: FW: AB-52 Consultation for Proposed PROJ-2023-000129, County of San Bernardino, California
Attachments: Cultural Resources Study for the Joshua Tree Estates Project.pdf; 23-01-005 East Broadway & Laferney (geo).pdf; 10754 Tentative Tract Map-TTM.pdf

Good afternoon,

I have attached the cultural resources study and geotechnical report for PROJ-2023-00129. These were previously sent in December 2024, but I am not sure they reached you since Laura Chatterton had left. I have also included the most recent site plan for this project.

Project Description: TENTATIVE TRACT MAP (TTM) 20668 TO SUBDIVIDE ONE (1) PARCEL INTO THIRTY-TWO (32) PARCELS, AT APPROXIMATELY 2.5 ACRES EACH, IN THE RURAL LIVING (RL) LAND USE CATEGORY AND THE JOSHUA TREE/ RURAL LIVING (JT/RL) ZONING DISTRICT; APN: 0605-051-01; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2023-00129.

Please let me know if you have any comments or mitigation measures for this project.

Thank you,

Maryn Mineo-Wells
Senior Planner
Land Use Services Department
Phone: 909-387-4738
Fax: 909-387-3223
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0187

Our job is to create a county in which those who reside and invest can prosper and achieve well-being.
www.SBCounty.gov

County of San Bernardino Confidentiality Notice: This communication contains confidential information sent solely for the use of the intended recipient. If you are not the intended recipient of this communication, you are not authorized to use it in any manner, except to immediately destroy it and notify the sender.

From: Tribal Historic Preservation Office <thpo@morongo-nsn.gov>
Sent: Wednesday, July 17, 2024 1:21 PM
To: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>
Cc: Laura Chatterton <lchatterton@morongo-nsn.gov>
Subject: AB-52 Consultation for Proposed PROJ-2023-000129, County of San Bernardino, California

You don't often get email from thpo@morongo-nsn.gov. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

The Morongo Band of Mission Indians (Tribe/MBMI) Tribal Historic Preservation Office received the County of San Bernardino (County) letter regarding the above referenced project on June 27, 2024. The proposed PROJ-2023-000129 Project (Project) is located within the ancestral territory and traditional use area of the Cahuilla and Serrano people of the Morongo Band of Mission Indians.
Tribal cultural resources are non-renewable resources and therefore of high importance to the Morongo Tribe, therefore, tribal participation (a.k.a. tribal monitors) is recommended during all ground disturbing activities. We look forward to working with the County to protect these irreplaceable resources out of respect for ancestors of the Morongo people who left them there, and for the people of today and for generations to come.
Projects within this area are potentially sensitive for cultural resources regardless of the presence or absence of remaining surface artifacts and features. Our office requests to initiate government-to-government consultation under Assembly Bill (AB) 52 (California Public Resources Code § 21080.3.1). Please see our attached letter.

Respectfully,

Laura Chatterton

Cultural Resource Specialist

Tribal Historic Preservation Office

Morongo Band of Mission Indians

12700 Pumarra Road

Banning, CA 92220

O: (951) 755.5256

C: (951) 663.7570

CONFIDENTIALITY: This e-mail may contain Privacy Act Data/Sensitive Data which is intended only for the use of the individual(s) to whom it is addressed. It may contain information that is privileged, confidential, or otherwise protected from disclosure under applicable laws. If you are not the intended recipient, you are hereby notified that any distribution or copy of this email is strictly prohibited.

The information contained in this communication is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, or distribution of this information is strictly prohibited and may be unlawful.

For your safety, the contents of this email have been scanned for viruses and malware.

Mineo-Wells, Maryn

From: Wells, Maryn
Sent: Monday, December 30, 2024 12:21 PM
To: 'Tribal Historic Preservation Office'
Cc: Laura Chatterton
Subject: RE: AB-52 Consultation for Proposed PROJ-2023-000129, County of San Bernardino, California
Attachments: Cultural Resources Study for the Joshua Tree Estates Project.pdf; 23-01-005 East Broadway & Laferney (geo).pdf

Good afternoon,

For your review, I have attached the cultural resources study and geotechnical report for PROJ-2023-00129.

Thank you,

Maryn Wells
Senior Planner
Land Use Services Department
Phone: 909-387-4738
Fax: 909-387-3223
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0187

Our job is to create a county in which those who reside and invest can prosper and achieve well-being.
www.SBCounty.gov

County of San Bernardino Confidentiality Notice: This communication contains confidential information sent solely for the use of the intended recipient. If you are not the intended recipient of this communication, you are not authorized to use it in any manner, except to immediately destroy it and notify the sender.

From: Tribal Historic Preservation Office <thpo@morongo-nsn.gov>
Sent: Wednesday, July 17, 2024 1:21 PM
To: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>
Cc: Laura Chatterton <lchatterton@morongo-nsn.gov>
Subject: AB-52 Consultation for Proposed PROJ-2023-000129, County of San Bernardino, California

You don't often get email from thpo@morongo-nsn.gov. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

The Morongo Band of Mission Indians (Tribe/MBMI) Tribal Historic Preservation Office received the County of San Bernardino (County) letter regarding the above referenced project on June 27, 2024. The proposed PROJ-2023-

000129 Project (Project) is located within the ancestral territory and traditional use area of the Cahuilla and Serrano people of the Morongo Band of Mission Indians.
Tribal cultural resources are non-renewable resources and therefore of high importance to the Morongo Tribe, therefore, tribal participation (a.k.a. tribal monitors) is recommended during all ground disturbing activities. We look forward to working with the County to protect these irreplaceable resources out of respect for ancestors of the Morongo people who left them there, and for the people of today and for generations to come.
Projects within this area are potentially sensitive for cultural resources regardless of the presence or absence of remaining surface artifacts and features. Our office requests to initiate government-to-government consultation under Assembly Bill (AB) 52 (California Public Resources Code § 21080.3.1). Please see our attached letter.

Respectfully,

Laura Chatterton

Cultural Resource Specialist

Tribal Historic Preservation Office

Morongo Band of Mission Indians

12700 Pumarra Road

Banning, CA 92220

O: (951) 755.5256

C: (951) 663.7570

CONFIDENTIALITY: This e-mail may contain Privacy Act Data/Sensitive Data which is intended only for the use of the individual(s) to whom it is addressed. It may contain information that is privileged, confidential, or otherwise protected from disclosure under applicable laws. If you are not the intended recipient, you are hereby notified that any distribution or copy of this email is strictly prohibited.

The information contained in this communication is confidential. It is intended solely for use by the recipient and others authorized to receive it. If you are not the recipient, you are hereby notified that any disclosure, copying, or distribution of this information is strictly prohibited and may be unlawful.

For your safety, the contents of this email have been scanned for viruses and malware.

Wells, Maryn

From: Kristen Tuosto <Kristen.Tuosto@sanmanuel-nsn.gov>
Sent: Friday, July 26, 2024 2:03 PM
To: Wells, Maryn
Subject: RE: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

Hello Maryn,

Thank you for providing the requested information, it helped us better understand what was found at the two sites discovered on the property.

After reviewing the reports and DPR forms, YSMN does not have any concerns with the project's implementation, as planned, at this time. As a result, YSMN requests that the following language be made a part of the project/permit/plan conditions:

CUL MMs

1. In the event that cultural resources are discovered during project activities, all work in the immediate vicinity of the find (within a 60-foot buffer) shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the other portions of the project outside of the buffered area may continue during this assessment period. Additionally, the Yuhaaviatam of San Manuel Nation Cultural Resources Department (YSMN) shall be contacted, as detailed within TCR-1, regarding any pre-contact finds and be provided information after the archaeologist makes his/her initial assessment of the nature of the find, so as to provide Tribal input with regards to significance and treatment.

2. If significant pre-contact cultural resources, as defined by CEQA (as amended, 2015), are discovered and avoidance cannot be ensured, the archaeologist shall develop a Monitoring and Treatment Plan, the drafts of which shall be provided to YSMN for review and comment, as detailed within TCR-1. The archaeologist shall monitor the remainder of the project and implement the Plan accordingly.

3. If human remains or funerary objects are encountered during any activities associated with the project, work in the immediate vicinity (within a 100-foot buffer of the find) shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5 and that code enforced for the duration of the project.

TCR MMs

1. The Yuhaaviatam of San Manuel Nation Cultural Resources Management Department (YSMN) shall be contacted, as detailed in CUL-1, of any pre-contact cultural resources discovered during project implementation, and be provided information regarding the nature of the find, so as to provide Tribal input with regards to significance and treatment. Should the find be deemed significant, as defined by CEQA (as amended, 2015), a Cultural Resources Monitoring and Treatment Plan shall be created by the archaeologist, in coordination with YSMN, and all subsequent finds shall be subject to this Plan. This Plan shall allow for a

monitor to be present that represents YSMN for the remainder of the project, should YSMN elect to place a monitor on-site.

2. Any and all archaeological/cultural documents created as a part of the project (isolate records, site records, survey reports, testing reports, etc.) shall be supplied to the applicant and Lead Agency for dissemination to YSMN. The Lead Agency and/or applicant shall, in good faith, consult with YSMN throughout the life of the project.

Note: Yuhaaviatam of San Manuel Nation realizes that there may be additional tribes claiming cultural affiliation to the area; however, Yuhaaviatam of San Manuel Nation can only speak for itself. The Tribe has no objection if the agency, developer, and/or archaeologist wishes to consult with other tribes in addition to YSMN and if the Lead Agency wishes to revise the conditions to recognize additional tribes.

Please provide the final copy of the project/permit/plan conditions so that YSMN may review the included language. If you should have any further questions with regard to this matter, please do not hesitate to contact me at your convenience, as I will be your Point of Contact (POC) for YSMN with respect to this project.

Regards,
Kristen

From: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>
Sent: Monday, July 15, 2024 8:54 AM
To: Kristen Tuosto <Kristen.Tuosto@sanmanuel-nsn.gov>
Subject: RE: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

Good morning Kristen,

Apologies for missing your earlier request. The report is attached.

Kind regards,

Maryn Wells
Planner
Land Use Services Department
Phone: 909-387-8311 / 760-776-6146
Fax: 909-387-3223
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0187

Our job is to create a county in which those who reside and invest can prosper and achieve well-being.
www.SBCounty.gov

County of San Bernardino Confidentiality Notice: This communication contains confidential information sent solely for the use of the intended recipient. If you are not the intended recipient of this communication, you are not authorized to use it in any manner, except to immediately destroy it and notify the sender.

From: Kristen Tuosto <Kristen.Tuosto@sanmanuel-nsn.gov>
Sent: Friday, July 12, 2024 3:02 PM
To: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>

Subject: FW: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

Hello Maryn,

Thank you for providing the requested information. Is it possible to get the DRP reports for the sites excavated during Phase II, as mentioned in the Cultural Report?

Thank you,
Kristen

From: Kristen Tuosto
Sent: Friday, June 14, 2024 3:50 PM
To: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>
Subject: RE: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

Hello Maryn,

Thank you for providing the requested information. Is it possible to get the DRP reports for the sites excavated during Phase II, as mentioned in the Cultural Report?

Thank you,
Kristen

From: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>
Sent: Thursday, June 13, 2024 11:24 AM
To: Kristen Tuosto <Kristen.Tuosto@sanmanuel-nsn.gov>
Subject: RE: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

Hi again,

The Geotech Report is attached. Please let me know if you need any additional information.

Thank you,

Maryn Wells
Planner
Land Use Services Department
Phone: 909-387-8311 / 760-776-6146
Fax: 909-387-3223
385 N. Arrowhead Ave.

San Bernardino, CA 92415-0187

Our job is to create a county in which those who reside and invest can prosper and achieve well-being.
www.SBCounty.gov

County of San Bernardino Confidentiality Notice: This communication contains confidential information sent solely for the use of the intended recipient. If you are not the intended recipient of this communication, you are not authorized to use it in any manner, except to immediately destroy it and notify the sender.

From: Wells, Maryn
Sent: Thursday, June 13, 2024 11:22 AM
To: Kristen.Tuosto@sanmanuel-nsn.gov
Subject: RE: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

Dear Kristen,

Thank you for your email. I have attached the requested Cultural Resources Study and site plan. The Geotech report will follow in a separate email due to size constraints.

The proposal is for subdivision only; construction is not proposed at this stage.

Kind regards,

Maryn Wells
Planner
Land Use Services Department
Phone: 909-387-8311 / 760-776-6146
Fax: 909-387-3223
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0187

Our job is to create a county in which those who reside and invest can prosper and achieve well-being.
www.SBCounty.gov

County of San Bernardino Confidentiality Notice: This communication contains confidential information sent solely for the use of the intended recipient. If you are not the intended recipient of this communication, you are not authorized to use it in any manner, except to immediately destroy it and notify the sender.

From: Kristen Tuosto <Kristen.Tuosto@sanmanuel-nsn.gov>
Sent: Wednesday, June 12, 2024 3:25 PM
To: Wells, Maryn <Maryn.Wells@lus.sbcounty.gov>
Subject: AB52: TTM 20668 to subdivide one parcel into thirty-tow, Project No. PROJ-2023-00129, SW Corner of Broadway St. and Laferney Ave., Joshua Tree; APN: 0605-051-01, San Bernardino County [COU-SB-2024-16]

You don't often get email from kristen.tuosto@sanmanuel-nsn.gov. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

Dear Maryn,

Thank you for contacting the Yuhaaviatam of San Manuel Nation (formerly the San Manuel Band of Mission Indians) regarding the above referenced project. YSMN appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on June 4, 2024, pursuant to CEQA (AB 52) and CA PRC 21080.3.1. The proposed project area is located within Serrano ancestral territory and, therefore, is of interest to the Tribe.

Due to the nature and location of the proposed project, YSMN respectfully requests the following for review upon availability:

- Cultural report
- Geotechnical report (if required for the project)
- Project plans showing the depth of proposed disturbance

The provision of this information will assist Yuhaaviatam of San Manuel Nation in ascertaining how the Tribe will assume consulting party status under CEQA and participate, moving forward, in project review and implementation. Please note that if this information cannot be provided within the Tribe's 30-day response window, the Tribe automatically elects to be a consulting party under CEQA, as stipulated in AB52. If you should have any questions with regard to this matter, please do not hesitate to contact me at your convenience, as I will be your Point of Contact (POC) for YSMN with respect to this project.

Regards,
Kristen

Kristen Tuosto
Tribal Archaeologist
Kristen.Tuosto@sanmanuel-nsn.gov
O:(909) 864-8933 x 50-3421
M:(909) 725-1357
26569 Community Center Dr Highland, California 92346